

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

No. 2192.—VOL. XLVII.

LONDON, SATURDAY, AUGUST 25, 1877.

PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, £1 4s.

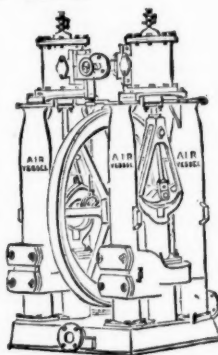
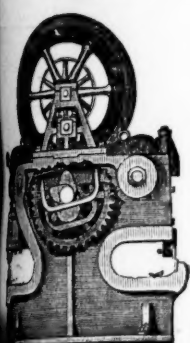
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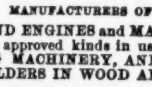


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PARIS,
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINIOG TUN-
NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operating
parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

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The Warsop Rock Drill

(Involving an entirely new principle in Mechanical Boring)

Requires only 20 lbs. steam or air-pressure.
Has only two moving parts—thus ensuring freedom from de-
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Is excessively light, and can be carried by one man, who can
with the No. 1 size (weighing only 35 lbs.) drill 40 holes
½ in. diameter and 1½ in. deep per minute, in the hardest Aber-
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AND

AIR COMPRESSORS.

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TUNNELS, SINKING

SHAFTS, AND PERFORMING

OPEN FIELD OPERATIONS,

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STRONGEST, & MOST EFFECTIVE

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LONDON: 52, QUEEN VICTORIA STREET, E.C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWTH
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines
Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the
Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esqair-
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,
Darlington; also Mr. Sewell, for Argenteiferous Copper Mines, Peru; the Brats-
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of
America, and Australia, from all of whom certificates of the complete efficiency of
the system can be had.

WASTE HEAPS, consisting of refuse chata and skimpings of a
former washing, containing a mixture of lead, blende, and sulphur,
DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-
in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly
profit on our Nanthead waste heaps amounted last year to £600, besides the ma-
chinery being occupied for some months in dressing ore-stuff from the mines. Of
course, if it had been wholly engaged in dressing wastes our returns would have
been greater; but it is giving us every satisfaction, and bringing the waste heaps
into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,
Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much
pleasure in stating that a full and superior set of your Ore Dressing Machinery has
been at work at these mines for fully a month, and each day as the moving parts
become smoother, and those in charge understand the working of the machinery
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,
and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines,
says—"Your machinery saves fully one-half on old wages, and vastly more on the
wages we have now to pay. Over and above the saving in cost is the saving in ore,
which is a .1 much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The
separation which they make is complete."

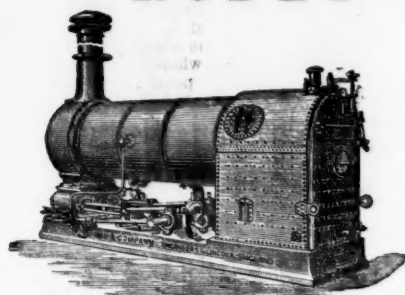
Mr. MONTAGUE BEALE says—"It will separate ore, however close
the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose
and will do for any kind of metallic ores—the very thing so long needed for dress-
ing-floors."

Drawings, specifications, and estimates will be forwarded on application to—
GEORGE GREEN, M.E., ABERYSTWTH SOUTH WALES

ROBEY & CO., ENGINEERS, LINCOLN,

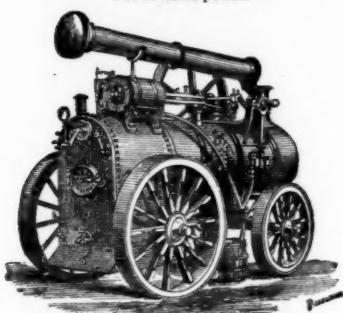
SOLE MANUFACTURERS OF THE



THE PATENT ROBEY FIXED ENGINE AND LOCOMOTIVE BOILER COMBINED, 4 to 50-horse power.

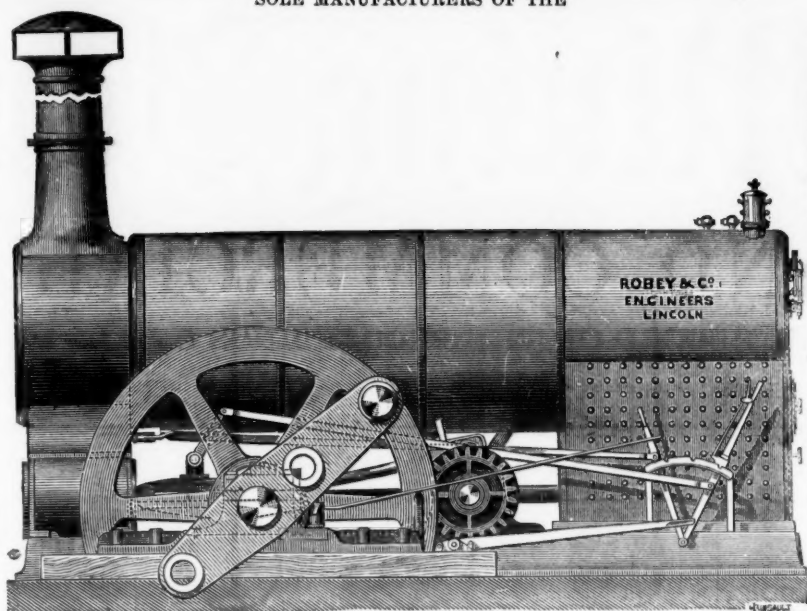


VERTICAL STATIONARY STEAM ENGINE AND PATENT BOILER COMBINED, 2 to 12 horse power.



SUPERIOR PORTABLE ENGINES, 4 to 50-horse power.

No Expensive Brick Buildings or High Chimney required.



PATENT IMPROVED ROBEY MINING ENGINE,

OF ALL SIZES, FROM 4 TO 50-HORSE POWER.

Some of the advantages of this New Engine are as follows:—

SMALL FIRST COST. SAVING OF TIME AND EXPENSE IN ERECTING. EASE, SAFETY, AND ECONOMY IN WORKING. GREAT SAVING IN FUEL.

This New Engine is free from all the objections that can be urged against using the Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable in saving time and expense in fixing.

THE PATENT ROBEY FIXED ENGINE

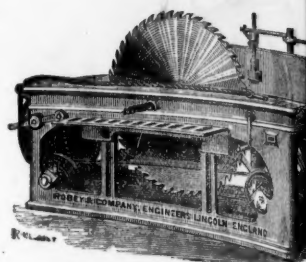
(Also above illustrated) is admirably adapted for driving Rolling Mills, Saw Mills, Brick Machinery, Pumping Machinery, and all descriptions of Fixed Machinery.

ENGINES UP TO 200 EFFECTIVE HORSE-POWER ALWAYS IN PROGRESS.

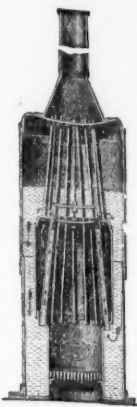
Prices and full particulars of all the Machinery here illustrated on application to the Sole Manufacturers,

ROBEY & CO., ENGINEERS, LINCOLN, ENGLAND.
London Office: 117, Cannon Street, London, E.C.

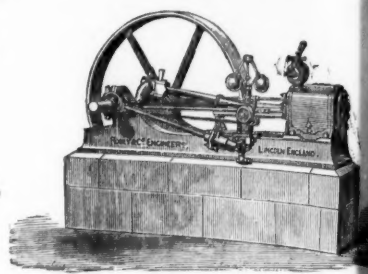
Boiler can be supplied with special Fire-box for Burning Wood, Sawdust, Turf, and every description of inferior Fuel.



SELF-ACTING CIRCULAR SAW BENCH.



PATENT VERTICAL BOILERS, 2 to 12 horse power.



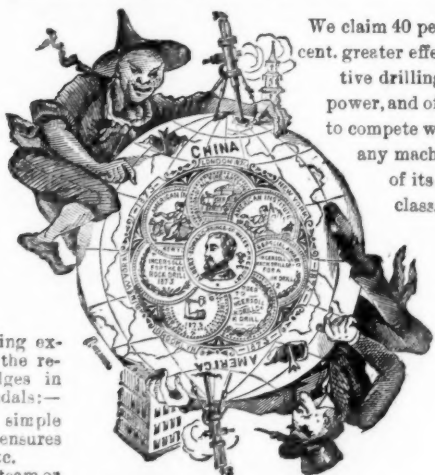
IMPROVED HORIZONTAL FIXED STEAM ENGINE, 4 to 60-horse Power.

PATENT "INGERSOLL ROCK DRILL,"

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We claim 40 per cent. greater effective drilling power, and offer to compete with any machine of its class.

See following extracts from the reports of Judges in awarding Medals:—

"2. Its simple construction ensures durability &c.

"4.—The steam or air cushions at each end of cylinder effectually protect from injury
"5. Its having an automatic feed, giving it a steady motion, &c.
"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.
"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

Medals awarded for several years in succession "For the reason that we judge it so important in its use and complete in its construction as to supplant every article previously used for accomplishing the same purpose."
Estimates given for Air Compressors and all kinds of Mining Machinery. Send for Illustrated Catalogues, Price Lists, Testimonials, &c., as above.

JOHN AND EDWIN WRIGHT,



PATENTERS. (ESTABLISHED 1770.)

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPE

from the very best quality of charcoal iron and steel wire.

PATENT FLAT AND ROUND HEMP ROPES,

SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES (made from Webster and Horsfall's patent steel wire), HEMP, FLAX, ENGINE YARN, COTTON WASTE, TARPAILING, OIL SHEETS, BRATTICE CLOTHS, &c.

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THE "CHAMPION" ROCK BORE

STANDS UNRIVALLED

For Tunnels, Mines, Quarries, Harbour Works, Cutting Blocks of Granite, &c.

The working parts are made of the toughest steel and phosphor-bronze—steel castings are also used—as to combine strength with light weight.

AIR-COMPRESSING MACHINERY

Of the simplest and best construction.

Combined Water-pressure Engines and Air-compressors Giving most excellent results.

ULLATHORNE AND CO., 63, QUEEN VICTORIA STREET, LONDON, E.C.

Archer's New Patent Stone Breakers.

Sole Makers: DUNSTON ENGINE WORKS CO., GATESHEAD-UPON-TYNE, ENGLAND.

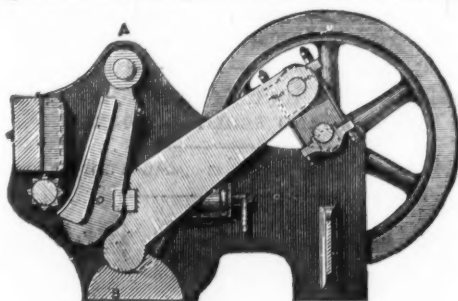
STONE BREAKER,

For Road Metal, &c.

Machines with combined Vertical Jaw and CUBING ROLLER.

Guaranteed to break more cubical and to make less small than any other Machine.

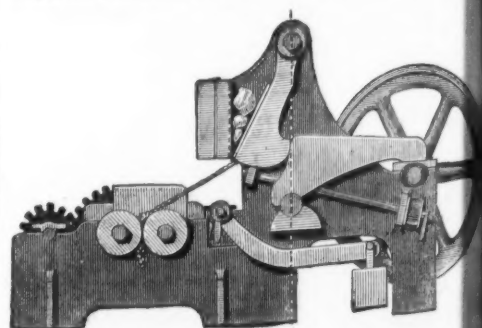
Simple Machines, with plain Vertical Jaws, without Roller.



PULVERISER,

For Crushing and Pulverising Rocks, Ores, &c., &c.

Apply for prices and particulars to the Manufacturers, as above.



ARCHER'S PATENT BONE MILL—Sole Manufacturers.

MANUFACTURERS OF MARINE AND STATIONARY ENGINES; AND COLLIERY MACHINERY, CAGES, TUBS, &c., every description of MACHINERY USED IN CHEMICAL WORKS.

Original Correspondence.

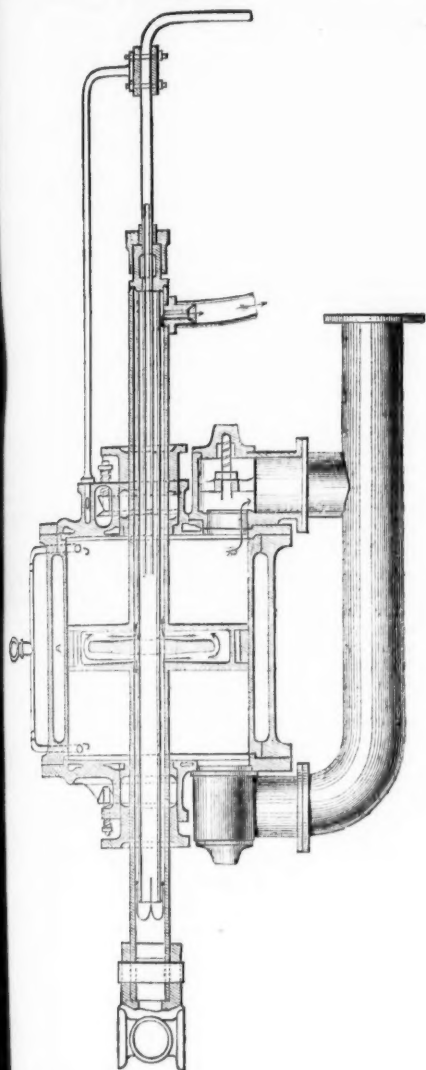
ORE STAMPING MACHINERY.

Sir.—The tabulated statement of the comparative working of certain American and Cornish stamping mills, contributed by your correspondent "M. P." in the Journal of the 18th inst., needs some comment. It would appear that the American stamps—Nos. 1 to 9—require on the average 57½ horse power to reduce 100 tons of ore in 24 hours, and that the Elephant Flexible Stamp takes only 48 horse power to do the like amount of work in the same time. If correct, is an extraordinary achievement, and will repay thorough investigation, for it is only by the adoption of the very best tools and economy of power that we can maintain our position in the face of the fierce competition to which we are exposed. Some errors have crept into the concluding remarks of your correspondent where he states that the American stamp, No. 1, requires 48 horse power to the 100 tons stamped in 24 hours. On reference to the table it is shown to be 102·27-horse power. I am anxious to know more about this Cornish stamp. Where can a battery be seen, and who are the makers?—Aug. 22. AN OLD CORRESPONDENT.

ROCK-BORING MACHINERY—No. IV.

COLLADON COMPRESSOR.—The Colladon Compressor (fig. 3) consists essentially of a horizontal cylinder and a hollow piston, the ends of which, also hollow, passes through both ends of the cylinder. In each of these covers are two admission and one delivery valves. The distinguishing feature of this compressor is, however, the method adopted for absorbing the heat developed during the compression of the air and for keeping all the parts cool. The cylinder

Fig. 3.



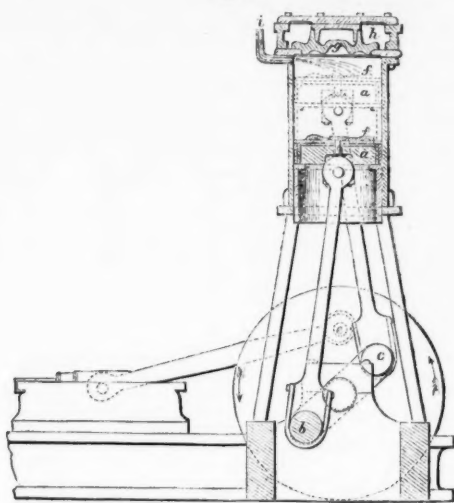
is surrounded by a water jacket, A, the piston and piston-rod have chambers for the reception and passage of water, while the end of the barrel of the cylinder is fitted with two jet pieces through which water is forced and broken into fine spray. It is so arranged that the quantity of water introduced into the cylinder from the various parts of the apparatus is so adjusted as to prevent the temperature from exceeding 25° centigrade or 79° Fahr. when the pistons are running at a speed of 200 ft. per minute. The water being compressed to 90 lbs. per inch. At the Airola end of the Gothard Tunnel there are twelve of these compressors, four in each of three cylinders each. The three cylinders are driven by side, and are driven by means of a three-throw crank in connection with wheel gearing and a turbine. The dimensions of these compressing cylinders are—

Diameter of cylinder	18½ inches.
Stroke of piston	17 7-10 in.
Pressure valves in end of each cover, internal diameter of seatings 4½ in., external diameter of valve 5 in., equal 19·6 area × 2 =	39·2 area.
One discharge valve in each cover, internal diameter of seatings 3½ in., external diameter of valve 4½ in., equal	10·3 area.
Theoretical volume of air per stroke	5·27 cub. feet.
Or, for each group of three cylinders	15·81 cub. feet.
At a velocity of 65 revolutions per minute three cylinders will afford theoretically	1027·65 cub. feet.
At a pressure of six atmospheres, or 90 lbs. per square inch, this quantity will be reduced in volume	171·27 cub. feet.
Actual volume, as proved by experiment, will not amount to more than 70 per cent. of the theoretical volume, or (171·27 × 70 =) 119·9 cubic feet. A series of four sizes of these compressors are manufactured. The first type, A, for the purpose of supplying a minimum velocity of 2½ ft. per second to drive one, B two, and D four boring machines.	
	A. B. C. D.
Diameter of compressor piston	In. 10½ 15 15 15
Stroke of piston	23½ 31 31 31
Revolutions per minute, maximum	124 90 90 90
Velocity of piston per second	Ft. 7½ 7½ 7½ 7½
Power required, min. vel.	H. power 12 25 50 75
Volume of air in cubic feet compressed	36 75 150 225
At 90 lbs. per inch, min. velocity	12·6 16·8 33·6 50·4
Maximum velocity	37·8 50·4 100·8 151·2

At the Macanetcong Tunnel, New Jersey, four compressors were employed to drive nine boring machines. These compressors con-

sisted of two vertical air cylinders coupled to a horizontal steam-engine. By referring to Fig. 4 it will be seen that the pistons, A, are worked from a shaft, the cranks, B and C, of which are at an

Fig. 4.



angle of 180°. With these the driving crank, E, forms an angle of 45°, so that the greatest work of the steam pistons is designed to correspond to the greatest resistance offered to the compressor pistons. The valves, F and G, are circular plates, held in place by vertical guides. The compressed air from the two cylinders is driven into a common chamber, H, and from thence conducted by pipes to a receiver. Water is admitted into the compressor cylinder through the pipe I, and serves to absorb the heat developed during the compression of the air. To furnish steam to drive the four compressors four tubular boilers of 45-horse power each were employed.

THREE-CYLINDER COMPRESSOR.—At the Rushen Mines, Isle of Man, a three-cylinder air compressor is erected for the purpose of accelerating the sinking of an engine-shaft by means of two boring machines. Each cylinder is single acting, the piston rods of which are in connection with a three-throw crank.

Diameter of each cylinder	13 inches.
Stroke of piston	18 inches.
One suction valve in each cover, internal diameter 5 in. = area	19·6
Two discharge valves in each cover, diameter 3 in., equal 7·0 area × 2 =	14·0
Theoretical volume of air per stroke	1·38 cub. ft.
Or, for the group of three cylinders	4·14 cub. ft.
At a velocity of 50 revolutions per minute three cylinders will afford theoretically	307 cubic ft.
Volume of air compressed to 50 lbs. per inch, at 70 per cent. of the contents of the stroke	36·3-10 cub. ft.

The cylinders of this compressor are encased in a jacket, the intervening space, about 4 inches, being charged with cold water. In addition a spray jet of water passes into each cylinder during the compression of the air. JOHN DARLINGTON.

MULTAFALL LEAD AND BLENDE MINES.

Sir.—It may be of interest to many of your readers to know that the proprietors of these mines (a full report upon which appeared in last week's Journal) have decided to furnish them with a complete dressing establishment of the most approved modern kind. As a preliminary step in this direction they have concluded arrangements with Mr. Green, of Aberystwith, engineer and originator of the Patent Self-Acting Dressing Machinery. In pursuance of which that gentleman has just gone over to the mines to inspect the topography of the sett, with the view of selecting an advantageous site for the proposed metallurgical arrangements. SPECTATOR.

GELLIVARA IRON MOUNTAIN—NEW GELLIVARA CO.

Sir.—In answer to the correspondent's ("C. H. A.") question, in last week's Journal, as to where he could get a supply in quantity of purest qualities of iron ores, sesquioxide of iron, kidney iron ores, red hematite (not under 95 per cent.), I would advise him to apply to the New Gellivara Company, who have a very pure iron on the Gellivara Mountain, fit for the finest Sheffield cutlery, &c. If the Government would give them land grants and facilities for making a railway from Gellivara across Norway to one of the fjords, it would enable them to have an open sea on the Atlantic seaboard all the year round, when they could ship an inexhaustible supply of purest iron to the British Islands. But the Swedish and Norwegian Parliaments, for the good of their country, should imitate what the United States have done with the Pacific Railway Company. "C. H. A." should apply to the office of the New Gellivara Company in London, Mr. H. D. Stead, who, I have no doubt, can satisfy him with a purest quality of iron ore, as they have been doing more for some time past to develop their iron trade. J. M. N. M.

NATIONAL ASSOCIATION OF COLLIERY MANAGERS.

Sir.—I was glad to observe from the announcement in last week's Journal that this Association is taking a definite form, as there can be no doubt that if it be properly developed it will become one of the most useful institutions in the country, but I am altogether opposed to the incorporation of the benefit society and trade unionism element, and cannot believe that it would make the society one whit more acceptable to any certificated manager who would be worthy of a place on the list of members of the Association. The utility of benefit societies cannot be too highly estimated, and trade unionism is well enough in its way, but neither of these have anything whatever to do with a scientific and literary society such as the National Association of Colliery Managers ought to be. The result of membership should be to give the member a higher position in the respect of colliery owners and the public than he has without it, and I have never yet seen that connection with a Trades Union has improved the reputation of any man, though it has frequently had the reverse effect.

The position of certificated managers at the present time is most unsatisfactory, for the Act of Parliament having authorised the issue of certificates of service (and I really do not see how such authorisation could have been avoided without depriving many very useful men of their means of livelihood) there are many entitled to call themselves certificated managers who are really more ignorant than the average working collier—that is to say, they know less of the nature of mine gases, less of the principles upon which the working of a mine are conducted, and less of the effect of faults and other natural disturbances. And this is not because they do not wish to learn, but because their very position prevents them from doing so. They hold a position for which they are incompetent, yet dare not let those under them know of their incompetency. The certificated manager cannot attend the night school like an ordinary working collier, because it would be a degradation to do so; he cannot attend high-class lectures, because he has not received sufficient elementary instruction to enable him to understand them. To the ignorant certificated manager, then, the Association, if constituted as a purely technical institution, would be invaluable for a reason I will presently show.

But how about the highly educated certificated managers? you will ask; for it is, of course, well known that some who hold the certificate of service, and many who have a certificate of competency, have received a careful scientific training which every year

of practical experience renders more valuable to them. To these I answer the Association will be still more useful, for at least in reputation it will put them a generation forward. At present, from the number of ignorant men holding managers' certificates, it is scarcely an honour to be called a certificated manager, and the Association ought to improve the status of the whole body, and thus make connection with it honourable. The whole matter is entirely in the hands of the educated portion, which possesses the power of elevating the ignorant portion, until the whole body is brought into such a condition that it will be as great an honour to belong to the National Association of Colliery Managers as to the Institution of Civil Engineers. Papers could be read by the educated managers which would speedily give their less fortunate colleagues all the information which it is absolutely necessary that they should possess in order to enable them to take part in the discussion of practical mining subjects. The uneducated manager could attend the periodical meetings of the National Association of Colliery Managers, and listen to the reading of papers prepared especially for their instruction, without incurring any of the unpleasantness of attending the night school with the men employed under him.

Whether the project will be a success or failure depends almost entirely upon the character and standing of those chosen for the executive. To secure success all except those of high scientific attainments and long practical experience should be excluded, and, as a rule, certificates of service should be regarded as of little value in comparison with certificates of competency. If this were done, and provided a good supply of really instructive papers could be obtained, a really useful association would soon be firmly established. Aug. 22. MANAGER.

TRACTION ENGINES.

Sir.—The means generally employed to transmit motive power from the crank or first motion shaft of a traction engine or self-moving carriage to the driving wheels of the same consists of a set or sets of spur wheels gearing into a similar wheel keyed on the axle of the driving wheels. This method of transmission is not only costly from the loss of power due to the friction of the working parts, but the wear and tear of the said parts required repeated attention and repairs. To remedy these defects is the object of the invention of Mr. William Fiskien, of Stamfordham, Northumberland, to which I should like to direct the attention of the readers of the Mining Journal. For the purpose in view he would have a toothed or ratchet wheel keyed upon the axle of the driving wheels of the traction engine or self-moving carriage. Upon the same axle and embracing the said ratchet wheel are placed two forked levers diametrically opposite each other, the axle of the said driving wheels being their common fulcrum, and upon which they rock when a rocking motion is conveyed to them by means of two longitudinal bars or eccentric rods connecting their extremities with a crank or eccentric on the crank shaft of the said engine, thus a rocking motion is imparted to the aforesaid rocking levers, which by means of pawls or other suitable means acting upon the above-mentioned ratchet wheel is converted into a continuous circular motion, and transmitted through the axle to the driving wheels of the traction engine or self-moving carriage.

Means are provided for reversing this continuous circular motion; this may be accomplished without reversing the motion of the steam piston by having to each rocking lever a double pawl, the appropriate engagement of which with the said ratchet wheel shall determine the direction of the circular motion of the same. Each double pawl is controlled or brought into proper action by pulling over in the desired direction a reversing lever to which the pawls are suitably connected by rods and springs. This reversing lever may be secured to one of the longitudinal bars and conveniently placed for easy access. The double pawls may be made to rock on their fulcrums by means of eccentric rods suitably connected from eccentrics on the crank shaft; by this means the pawls will be free from the ratchet wheel during the return of the rocking lever, and will be brought into use only when about to engage with the teeth of the said ratchet wheel. This arrangement will avoid the use of springs to keep the pawls up to their work, and the consequent clatter due to the travelling of the pawls over the teeth of the ratchet wheel.—Gateshead, Aug. 18. H. D. F.

THE MINING INTERESTS—PERSEVERANCE.

Sir.—Perseverance in the attainment of the objects in view is, we must all admit, a prime quality in the grain and stamina of every pursuit, whether it be commerce, trade, manufacture, or any other department of the world's industries, and such being the case in a wide and general sense, how much more is it required in mining? Men fail far oftener from a want of perseverance than an absence of talent and judgment in starting their enterprises. Mining too often fails from simple lack of that earnest, patient, and continuous perseverance essentially needed in maturing operations—i.e., the realisation of pioneer points; it is no use to drive cross-cuts, sink shafts, or to extend levels if you stop short of reaching the objects aimed at at starting. Numerous instances of brilliant success can be adduced in favour of perseverance, and of sad failures through the absence of it.

South Caradon, Devon Great Consols, Tresavean, Great Laxey, Carn Brea, Tincroft, with Dolcoath, are instances in favour of perseverance, and many other mines can be enumerated which were abandoned when on the point of achieving success. Again, we have favourable examples to encourage perseverance in the Cambrian, Leadhills, East and West Chiverton, and West Craven Moor; the development of these mines is attended with results that promise at an early date to raise the standard of mining to its former prosperous status among the favourite investments of the day. We by no means advocate niggardly or dilatory expenditure of capital in mining; we insist, however, on practically sound economy being observed in every department. There is no reason for dressing machinery being purchased and erected before the ore is discovered to recoup the cost, nor have the executive to consider the interests of merchants, manufacturers, or tradesmen; their aim and conduct should ever gravitate in favour of shareholders, irrespective of any increased popularity they may acquire or advantage they may gain through expending large sums of money when smaller ones will suffice; in fact, "practical miners" regard the adventures under their control as the properties of the shareholders alone, while in some instances favourite market mines are notoriously worked under the supervision of "experts" exclusively for the interests of promoters and their subordinates.

When we reflect that 25 years ago we had no railways or telegraphs into Cornwall or North and South Wales, that the present century has witnessed marvellous advancement in the education and character of the middle classes, the sciences and the arts, in manufacture and machinery, the dressing of ores and the separation of different minerals contained in the same stone, their respective values and uses, together with the greatly increased knowledge prevailing in regard to the formation of mineral deposits, mineralogy, and geology, and of magnetism and electricity, we cannot be surprised at the ignorance of mine agents in the olden times.

South Caradon was abandoned as worthless by a London company, who had their miserably misleading "experts" to guide them, but who, after considerable expenditure of time and money, lacked perseverance, and the company came to grief. A new one, however, was soon formed by two brothers, who possessed slender means and slight reputation at the time, yet they proved to be practical miners, and won a mine that has declared dividends of 378,112, on a capital of 640, only. These brothers made large fortunes through having perseverance and pluck to encounter the additional expenditure of 640. Again, this company has employed for 30 up to 40 years from 500 up to 1000 workpeople, spent immense sums of money in machinery and materials, and in varied ways benefited the trade and commerce of the district—tradesmen, merchants, bankers, workmen, and executives being alike advantaged through the perseverance of these two practicals in bringing the mine into a successful position.

The most remarkable instance of rapid discovery during the present century was witnessed at the Devon Great Consols, about the year 1845. This property was abandoned by the "experts," and

soon after secured by that indefatigable and persevering miner, Mr. Josiah Hitchins, of Tavistock, who, upon an expenditure of 1024*l.*, raised its commercial value to 1,000,000*l.* Nor was this price unwarranted or greatly in excess of its actual worth, for the company is still profitable, and declared a dividend of 2500*l.* in July. This lode proved wonderfully profitable, but I understand that it was the high character of the gossan back which first rivetted Mr. Hitchins' attention. Mr. Hitchins' remarkably prophetic words at an early stage of the development of the lode being the following:—"This property is pregnant with such astounding results as will surprise the world;" the close upon 1,200,000*l.* in dividends which has been paid being a brilliant realisation of that prediction. This property, from the year 1845 to 1872 inclusive, sold 567,637 tons of copper ores, the money value being 3,056,109*l.*, to which must be added other credits (94,469*l.*), raising the total to 3,150,578*l.* Of this sum 1,352,310*l.* was expended in miners' labour, and in steam-engines, water-wheels, railway, machinery, timber, iron, and other materials, taxes, water rent, salaries, office expenses, &c., the sum of 362,970*l.* The Duke of Bedford for dues or royalties received the sum of 240,000*l.*, and the shareholders, who had expended 1024*l.* only, had dividends of 1,186,818*l.*, or close on twelve hundredfold their original outlay. The balance carried over in 1872 was 847*l.* 7*s.*, since which date the company has been reorganised, and consists now of 10,240 shares of 5*l.* each, with 1*l.* called up; marketable at 4*l.* 10*s.* to 5*l.* The prospects have greatly advanced of late.

Again, Cambrian Mines (Limited), and fully paid up, are situated in Cardiganshire, and exhibit unmistakable signs of vast deposits of mineral wealth, both as regards copper and lead. The company's concession is most extensive, and possesses scope for two or three separate mines. The Esgair Hir has yielded immense quantities of lead ore, and a long course of it is already discovered, requiring only time and perseverance to develop into a prosperous mine like the Van, Lisburne, Dyliffe, and Cwmystwith stand in the same north and south or magnetic parallel with it. Practical management, as at South Caradon, Devon Great Consols, Tresavean, Carn Brea, Tincroft, and other great important mines in Cornwall, North and South Wales, Yorkshire, and far north and south into Scotland, is required to ensure success. The Esgair-fraith is already an established success. The ores are rich in character, and found in bulk, the lode being worth 50*l.* to 60*l.* per fathom for each. Leadhills continues to open out well, and the yield will materially augment. The ores realised for the four months since the dividend of 6*s.* a share was declared in March last will fully justify the directors in paying another shortly. There is something affecting the market value of these shares, otherwise they would advance on merit. This is a market mine, and probably in the present depressed state of the Stock Exchange business there is a leverage at work to lower the prices, or rather quotations. This mine, the Hulta-fall, and the Cambrian must be regarded as the three established properties, *par excellence*, of the present year.

Carn Brea, Tincroft, and Dolcoath.—The two first mines were started for a second or third time about the year 1834 or 1835, having been exceedingly rich and profitable, though twice abandoned as worthless. These mines have netted the present companies 308,000*l.* and 302,550*l.*, on 36,375*l.* and 54,000*l.* capitals respectively. Dolcoath shares fell about the years 1837-38 to 8*l.* and 10*l.* per 179th share, and several shareholders relinquished for the value of the materials rather than respond to small calls to resuscitate the property, which had gradually collapsed through the exhaustion of the shallow deposits of ore. It is a singular reward to the shareholders who held and persevered over a period of 14 years without a single dividend, that the shares have since been multiplied by 24, and sold at 90*l.* each (2160*l.*) for the original 8*l.* to 10*l.* share. The aggregate dividends have been 480,000*l.* So much for earnest perseverance.

Great Laxey shares are firm at 21*l.* to 21*l.* 1*s.* There is a permanency in this property that defies the efforts of dealers in shares to depress quotations of prices, or to destroy the confidence of shareholders, sellers being very scarce on 'Change. The dividends are 10*s.* quarterly, thus purchasers secure 9*l.* to 10 per cent. in buying at ruling prices. The aggregate dividends up to date amount to 332,250*l.*, just over five and a half-fold the outlay. The dividends are at the rate of 30,000*l.* annually, or 50 per cent. on the paid-up capital. The finance is sound, the reserves of lead and blende ores large, and the machinery for all purposes replete and adequate, while the executive is strictly practical, but the success of this mine has been checked, and is attributable to the great principle of perseverance carried out under difficulties.

East and West Chiverton adjoin, are traversed by the same lodes, and under the same management. Capt. Southey writes most confidently of the discoveries made and the promise as regards the future. The locality is sound in respect of geological position; the mines so situated and worked practically, economically, and with perseverance have invariably proved successful. As examples we enumerate West Chiverton, Old Shepherd, and East Rose. These mines were *de facto* in their development less promising than the East Chiverton is at present, while it may be added that the ore is found at the same depth as the main deposits in the three important properties referred to, and which in their day were stars of the first magnitude, though exceptionally adverse circumstances caused the workings to be abandoned at both East Rose and Old Shepherd.

Tresavean, abandoned as a failure, was taken up by the late Mr. Thomas Teague, who was one of the most plucky and persevering miners in Cornwall; with an outlay of about 1000*l.* he succeeded in discovering deeper deposits of mineral wealth. The mine is a very dry one, and the lodes were productive in the granite, becoming profitless when they pass into the clay-slate. Under different companies this old mine has made 800,000*l.* profits. From the year 1814 to June 1848, it returned the enormous quantity of 377,970 tons of copper ores, which realised 1,879,735*l.* The last company was divided into 96 shares, and only 3120*l.* was paid thereon. It netted profits to the amount of 453,700*l.* The highest amount of dividends in one year was 60,480*l.*; the shares about this time were marketable at 2500*l.* each, 32*l.* 10*s.* paid, and at that price the value was only four years' purchase. This mine, and almost every other great success, sprang from continuous practical perseverance.

Reputation is a significant, yet a very ugly, word, still we are told there is a model panic, so to speak, at Buenos Ayres, because "property will not fetch 50 per cent. in paper money of what in 1874 and 1875 it would have brought in gold." There are a great many States, municipalities, and corporations besides Buenos Ayres in North and South America, and in various parts of Europe, drifting into a state of unenviable embarrassment, and before we have settled the general indebtedness of the "world to England" we shall witness many such "scenes" as that now being enacted at Buenos Ayres, which is a land, we are assured, literally flowing with milk and honey. It is not a community stricken with famine or pestilence, and dwelling in a land where the earth refuses its increase. It happens to be one of the richest and grandest of countries, where climate, soil, and all the essential conditions of prosperity characterise a most harmonious and effective combination. If such a panic exists at Buenos Ayres, what can we expect a year hence at St. Petersburg and Stamboul? The colossal amount of foreign debt due to England makes us dwell more forcibly and seriously on the subject than we otherwise should. There can be no question that Great Britain possesses almost inexhaustible mineral and metallic wealth; hence, it is not far preferable to work our mines than to lend without advantage to the working masses our money to the foreigner?

South Caradon still pays 2*l.* a share dividend four-monthly, and are marketable at 110*l.* each, with 1*l.* 5*s.* called up. Devon Great Consols gave a 5*s.* dividend last month, and shares sell at 4*l.* with 1*l.* called up. Great Laxey pays 10*s.* quarterly, and sells at 21*l.* a share. Carn Brea, Tincroft, and Dolcoath shares sell respectively at 28, 12, and 25 each.

There are other and very important mines now on the tapis, and should this notice fall under the observation of persevering capitalists they will clearly comprehend that there are as good prizes to be secured as ever rewarded the "Clymo's" in South Caradon, East and West Caradon, the Trelawny, Mary Ann, and Herodfoot, or in the case of "Mr. Josiah Hitchins" in Devon Great Consols,

Bedford United, South Tamar, Holmbush, and Hing-ton Down; a "Bennett" in the Deep Level, Tolvaidden, Alfred Consols, and a Trenow Consols, or the never to be forgotten "Troffery" in Llanes-cott, Par Consols, and Fowey Consols; a "Teague" in Tincroft and Kitty; again, a "Lyle" in North Basset, West Basset, and Great South Tolgus; a "Tredinnick" in a St. Ives Consols, Tr-nwith, Dartington, and an East Crofty, the only thing required being perseverance, and a resolute determination to work the mines, and to await the development thereof to make sure of substantial dividends upon money expended by original shareholders, instead of embarking in properties the inherent worth of which has been over-discounted by keen Stock Exchange speculators.

As, for example, ten shares in each of the subjoined ten mines would have entailed to an original shareholder the subscription of 793*l.* 15*s.* only:—

	Capital.	Dividends.	Market price.
South Caradon	£ 12 1/2	£ 1,100
Van	42 1/2	330
Great Laxey	40	210
Lisburne	187 1/2	750
Miners	50	100
Devon Great Consols ...	10	450
Basset	21 1/2	120
Tincroft	90	140
West Chiverton	125	505
Wicklow	25	—
Total	£ 793 15	£ 3,200

Thus, 793*l.* 15*s.* subscribed on ten shares in each of the above ten mines would have returned 33,981*l.* 10*s.* in dividends, leaving the shares in eight of them dealt in on the London Stock Exchange worth 3200*l.* for present realisation.

R. TREDINNICK,
Consulting and Advising Mining Engineer.
Exchange, 66, Coleman-street, London, E.C., Aug. 20.

MINING IN CORNWALL—BEDFORD UNITED.

SIR,—In the lull and stagnation of business generally, I believe there is no denser atmosphere than that at present surrounding mining enterprise, but the fact should not be lost sight of that no adverse influence at surface, whether arising from the low price of metals or any other cause, can affect the character of lodes underground. Notwithstanding, under these depressions there is a disposition to belaud everything in connection with mining. There is no doubt that this is the time to make money by investing in mines, but whoever gains does it generally through the sacrifice of others, and I begin to feel that the losses we often sustain are owing in a great measure to the very meagre information we get from our agents, as furnished by the usual weekly and quarterly reports. Now, we are well aware that a mine may be reported on in different ways, and that the agents have different modes of justifying themselves in respect to their reports. A small number of shareholders only know anything of the mode usually adopted to ascertain the value of the ore ground or reserves of a mine, and who, from the usual reports, can approximate the value of the lode they have in the mine. Furnished with a statement of the value of ore ground or reserves of any productive mine, I maintain that it is just as practicable to ascertain the value of a person's interest in a mine as to learn his position at a bank by a reference to his bank account.

It is cheering to observe that there are some stars in the mining sky whose brightness appears to be breaking through the prevailing gloom. Of those being noticed, I would at present call attention to the Bedford United. This star having long been the subject of prophecy by both old and younger prophets, I have kept a steady eye watching its growing lustre. I remember its shining having attained in money value to the amount of many thousands during the late management; in fact, it looked very brilliant when the new manager assumed authority, and, aided by an increase of both water and steam, as a moving star it has had a shining course during the last twelve or more months, and dull must be the eye that does not see its brightness. Probably the telescope has not been placed before all eyes at the same focus. It is a source of satisfaction to many, I understand, that nothing has of late been heard of boring machines being applied to this star as a propelling power, as it is considered by keen observers that it is moving fast enough without them—at least for the present. Should further appliances be requisite for judicious working, practical stoping of some of the valuable ground would meet the cost of the same without further calling upon the adventurers. Judging from calculations made upon the reports of the last few years, I estimate that there must be a reserve of from 20,000 to 30,000*l.* worth of ore now laid open, which is being monthly increased by the value of 1000*l.* I do not understand that communication has been effected to the 127 west, and hoped by this time that a winze would have been sunk through this very rich portion of the mine. I remember that on the shaft reaching this level the lode was reported to be of great value, with at a certain point near 100*l.* per fathom. I presume that operations in this direction would increase the monthly returns to the extent of at least 150*l.*

Although my name does not appear in the share list of this mine, I think it right to state here that I am indirectly heavily interested, and, in conjunction with many of the shareholders, express a hope that the majority will see to their own interest, and effectually protect against the confirmation of "limited liability" fixed for the 30th inst. That the adventurers should be asked to sanction this measure is superfluous, which in effect is asking 1*l.* per share as calls, when the reserves, if properly managed, would be found sufficient to support such a practical mode of operation as would in a little time become highly profitable.

JOSIAH WEDGEWOOD.
Tavistock, Aug. 22.

WHEAL GRENVILLE.

SIR,—I agree with some of "Shareholder's" remarks in last week's Journal, but to other portions of his letter I must object. In your columns of June 30 the secretary of Wheal Grenville made some severe observations in reference to West Basset Mine, and said, "When one considers the fact that the committee did, if it does not now, consist of two tin smelters, an engineer, and a tin-stone buyer it is easy to discern that other interests than those of the shareholders were in the minds of the executive." The insinuation underlying this would be beneath the notice of every honourable man to whom the parties reflected upon are known were it not subsequently supplemented by condemnatory observations upon the quality of some materials supplied to a mine of which Mr. Laws is himself the secretary. In the Journal of Aug. 4 Mr. Laws condemned pitwork which had been purchased for Wheal Grenville, and on Aug. 11 he writes an apology, saying that "He was mistaken, and that he has now ample evidence that the pumps he had previously condemned are all that is desired, and fully equal to the duties required of them; at the same time he wishes to state that he had no intention to cast any reflection upon the committee of Wheal Grenville."

Comment upon all this is superfluous. I will only remark that I hope for the future before Mr. Laws rushes into print with insinuations against the honour of local executives, he will not forget the amount of humble pie he has evidently allowed to satisfy the honour of one of his own committees. With regard to "Shareholder's" eulogies on Capt. Hodge and his management, they may be all deserved, but your correspondent is evidently an enthusiastic admirer. We were told when Capt. Hodge was appointed that the shareholders had done wisely, and that they would very soon see a great change for the better in the affairs of the company. Will "Shareholder" point out where this change appears? Will he say that it is in the large amount of money the shareholders have been called upon to subscribe, and in the erection of extensive machinery and other appliances which every disinterested and prudent person must condemn.

As has often been stated in the Journal, when the Wheal Grenville committee took office they told the shareholders it was absolutely necessary, to ensure the future favourable progress of the company, that the whole of the old managers should be discharged. Who does not remember the boasts—the flattering promises—of subsequent meetings, the repeated assurances of the satisfactory progress of the mine, and its quarterly enhanced prospects? Can your enthusiastic correspondent point out to us one single realisation of these assurances? When he can I may possibly join in his peans upon the manager. At present, in my view (and I think it

is a pretty general opinion), the management thus far is a failure. If the shareholders are content to go on spending money, having confidence in the ability and judgment of their executive, by all means let them do so, but when that executive is lauded for being something beyond the common run of mine management, let us know if its extraordinary characterisation would do well to close your columns to all such adulation for the future. The disinterested public, of which I am one, you may assured are heartily sick of hearing about the superior character of Wheal Grenville management.

Redruth, Aug. 21.

NORTH LAXEY MINING COMPANY.

SIR,—Though I did not intend to take any more notice of anonymous correspondent, "Another Shareholder in North Laxey," I cannot resist the temptation of pointing out how forcibly he confirmed the justice of my having "dubbed" him unscrupulous in his further letter in last week's Journal.

There is no transfer fee of any kind or description charged by the company; and, therefore, this "nice little addition to 166*l.*" only exists in the imagination of your correspondent, whose assertions are even more reckless and unjustifiable than is usual of anonymous complainants.

The manner in which your correspondent attempts to wriggle of his false statement as to the "remuneration" is too contemptuous to draw attention to. He speaks of his having "omitted" words about as trifling in themselves as the amount they represent. Before omitting them he should first have ascertained if they were trifling; but I need not say that office rent and other expenses are not got for trifling expense in London, leaving out the 166*l.* for postage and stamps.

In his letter, which appeared on Aug. 4, he said he saw for himself that the principal portion of the accounts were kept at mine, which is also false; and while he grounds his complaint on the expenses in London, he takes on himself to be a judge of way in which the mine is worked, and speaks favourably of it. Now, when his fallacies are exposed on the former point, he round and says "we have a most excellent mine if it were worked and managed in a judicious manner. It is this last question which is disturbing the mind of more than one shareholder."

J. H. MURCHISON, London Manager and Secretary.

August 21.

LEAD MINING IN WALES.

SIR,—Those who contend for "legitimate mining" cannot regard with satisfaction the insertion in the Journal of such a letter as that from "A Welshman" in last week's Journal, having been particularly to matters connected with the promotion of a company lately formed to work the Esgair-hir Mine, Cardiganshire. A recent visit to some of the lead mines of that district has convinced me that many valuable mines there are now standing for want of working capital; and there can be very little doubt that companies were formed on an equitable basis for working such properties, and the capital raised were expended on the mine instead of being divided, as too often happens, amongst promoters that good returns of lead would be obtained, and the heavy which (in consequence of such proceedings as those named in "Welshman's" letter) now hangs over mining enterprises in the district would soon be dispersed, and the mines again become as in the renowned as successful enterprises.

AN ENGLISHMAN.

MINING IN WALES—ESGAIR-HIR MINE.

SIR,—I notice in last Saturday's Journal a letter respecting mine signed "Welshman" in which it is stated that a thorough possible for the mine to return a profit on 20,000*l.* the idea of returning a profit on 100,000*l.* is out of the question. May I ask what authority "Welshman" presumes to make such a statement? Does "Welshman" know anything whatever about the present conditions at the mine? By what subtle means can "Welshman" tend to foretell the amount of ore in the bowels of the earth? There are not many contingencies which make it quite impossible to define the productive powers of a mine. I learn from a work published some years since by Mr. Murchison that Esgair-hir Mine returned immense quantities of ore right up to the surface, and the lode is one of the greatest ever discovered. Again, I ask, what subtle means does "Welshman" employ to enable him to ascertain the amount of mineral contained therein?

Aug. 22. A CONSTANT READER.

MINING IN WALES—ESGAIR-HIR MINE.

SIR,—Allow me to relate a circumstance in connection with mine. During the time Mr. Williams owned the property under local endeavours I mean—were made to form a company to chase and work the mine. With the view of forwarding such Mr. Fryer (Sir Pryse Pryse's agent) tried to induce the tenant of the Gogerddan estate to take shares; and although they all held in the great value of the mine they, with the proverbial slow Welshmen, deferred action. In the meantime Mr. Williams, another purchaser. Now, Sir, I would ask is the party who "gratified" a "Welshman," in last week's Journal, a "disappointed" Are the grapes sour?

ENGLISHMAN.

LEAD MINING IN WALES—MANAGEMENT.

SIR,—Observing a few lines under this head in last week's Journal signed "A Welshman," calling attention to an article appeared in the Cambrian News respecting the Cambrian mine, written by one who would seem to be very anxious that should be carried out legitimately in this county, but whose intention is, probably, to do an injury to the Cambrian Mining Company, and with them the mines surrounding those properties, that this is so I will take his first remarks on Esgair-hir, which is stated: "Its history can be read with interest and profit by who feel disposed to invest capital in undertakings respecting a rule, they can obtain no information beyond what is voluminous in prospectuses issued by promoters of companies." It will be less to dwell on the fact that this property is within 24 hours from any part of the kingdom, and that more has been written of its former richness than any other property in Cardiganshire, perhaps, in the Principality. (See Waller's account, 1690.) The three great landed proprietors in Cardiganshire are Lord Llewellyn, Col. Powell, and Sir Pryse Pryse. After some further remarks stated: "Local confidence, however, will not be restored, unless the landowners of Wales take a personal interest in mining, encourage the establishment of local companies, and work at any rate to the extent with local capital."

May I ask the writer of that letter to answer when the owners in this county took any interest in the working of the mine? I have been here for nearly 40 years, and during that time I think I can vouch for the fact that all the three great landed proprietors have not expended in mining 40*l.* altogether; and I fearlessly assert that during that time only a few hundred pounds have been expended by parties residing in the district. I have no interest in the Cambrian Mines (other than having ported on the mines for the present holders), and I have stated gratified at being able to state that not only what I have stated to the value of these mines is now being realised, but the ground now opening out at different points of operation are excess as to value than anything I mentioned, and I may add, without fear of contradiction, that the ground opened out by the company is the richest opened out in this county for the last years. This, then, I would advise, that everyone interested in the mines should come and see for themselves what is now being done, and not be frightened by what may be said by anyone residing there, and as I before stated, the journey can be easily performed, and it will be to their interest to do so instead of listening to the emanations from whatever quarter and from whom they may find vent.

The ore ground already laid open and in sight is sufficient to yield a large percentage on the capital of the company (10,000*l.*), and

Meetings of Public Companies.

RICHMOND CONSOLIDATED MINING COMPANY.

The adjourned general meeting of shareholders was held at the Cannon-street Hotel, on Thursday.

Mr. JOHN ELLIOTT in the chair.

Mr. HUBERT AKERS (the secretary) read the notice calling the meeting.

The CHAIRMAN said, as he had no doubt they were all very anxious to hear the news which had been received that morning, he would depart from the usual course of proceeding, and at once read the telegram which had been received. Two had come in that morning, one from Messrs. Wilson and Wren, the company's eminent counsel, and the other from Mr. Probert, as a sort of commentary on the first. The telegram from Messrs. Wilson and Wren read thus:—"Court has announced generally its decision against us, denoting finding of facts and law not settled. We believe there are sufficient errors to reverse in Supreme Court." That, as he had said, was signed by the company's two eminent counsel. The telegram from Mr. Probert was:—"Decision against law and facts. We hold possession during prosecution of appeal." And then there was this addition to the telegram:—"The ore above the 4th level rich, and quality increasing." The expression "denoting" was used in the sense of intimating or pointing out, so the Court left the company in possession of the property during the prosecution of the appeal. The shareholders must form their own opinion as to what the telegram meant. The telegrams generally came over very short, leaving the directors to supply, by their own common sense, the obvious meaning. The impression conveyed to his own mind was that the Court had intimated the finding of facts, and the law was not settled, and the counsel said they believed there were sufficient errors to reverse the decision in the Supreme Court. He had always warned the shareholders that they must not expect to get a favourable decision in a local Court, or from anything save an appeal. If the company's case was good, as undoubtedly it was, they always had that chance, and he thought the shareholders might rest fully assured that the appeal would be in the company's favour. So far as he had himself studied the case he could not conceive a verdict being given against the company in the Supreme Court. However, he would not comment upon the case; each shareholder must form his own conclusion. It was a very mortifying case, but he would recall to their recollection that when he met them in 1873 the directors had a worse case to bring to the notice of the shareholders. At that time the company stood in infinitely greater jeopardy than now, but they fought that battle through very successfully. He believed it was not the custom of Englishmen to despond at any slight reverse of this kind. They must expect it in all human affairs; and he had no doubt that if the shareholders held together, and pulled together, they would win this great fight also.

Dr. BISHOP asked the name of the Court in which the case had been tried? The CHAIRMAN said it was one of the United States District Courts. Dr. BISHOP said he thought so, but he simply asked in order that the reply might give information to the shareholders. He himself had 16 or 17 units going on in those United States District Courts. He should like to know if Stephen J. Field was one of the judges? He knew Mr. Field (who was the brother of Mr. Cyrus Field, so well known in connection with telegraphy) personally. The CHAIRMAN said he was not possessed of any information on that point. At any rate the decision gave the right of appeal. On that point there was no doubt whatever, and the law left the company in possession of the property in the meantime, which was a highly favourable feature. (Hear, hear.)

Dr. BISHOP: You had three judges presiding, but you do not know whether you had Mr. Field for you or against you? The CHAIRMAN said he was unable to say. The directors had received three cables following one upon the other, the first stating the decision would be given on Wednesday; then came another, stating that it was possible it might be adjourned, in consequence of the indisposition of Judge Field, so whether the other judges would sit he could not say.

Dr. BISHOP said the bearing of the question was this; if two judges carried the case against Judge Field, in that case, if Judge Field was in a minority, they would have him in favour of the company in the Court of Appeal at Washington.

A SHAREHOLDER: Can we work in the meantime? The CHAIRMAN said he had given them the exact words of the telegram, but he did not like to give his impression more than he had done. It was safer not to do so. The board would receive more detailed information in a few hours, and it was better to wait. (Hear, hear.) At the last meeting they went as far as the ordinary business as to move the adoption of the report and accounts, and it was now his duty to move their adoption. The accounts themselves were in such a very simple form that they required very little explanation from him. At the last meeting the directors brought under the notice of the shareholders the extreme inconvenience attending the taking of accounts at a time of the year when they were in full running, and when it was almost impossible to get accurately at the stores and stocks other than by ledger balances. The doing that necessarily led to some errors, and when they took stock upon the running down of the furnace they found these errors had accumulated to a very large extent, and although they extended over some years, 20,000, was a large deficiency to be accounted for. It was not a loss, but they had taken credit for that much more in stocks than they should have done. On the present occasion the company had got the benefit of the change. By that change they knew exactly the position of the company's affairs, virtually without estimate, because they would see by reference to the accounts that the assets were really reducible to bullion and stores in hand, which could be readily sold at the price put upon them. They had not an ounce of ore on the dump, and, therefore, that item was obliterated, and what was the result? The shareholders had been told last autumn that they were on the eve of collapse, and could not pay the bullion agent, and could not pay the dividend, and that the dividend which had been paid had been paid out of borrowed money. The company had had bad times before, from causes which he would shortly explain. First, as regarded the grade of the ore, and the causes which tended to depreciate silver to a low rate; yet, in spite of that, what had they done? The directors had since given the shareholders 0.000, in dividends, and were further prepared but for the suit in February to pay another 20,000, still leaving 13,000, in hand, and that, too, after providing in bullion and realisable assets for the whole of the borrowed money; and in March last, so far from being over head and ears in debt with the bullion agent, the company was in a position to pay the bullion agent the actual value of the bullion in hand, and in June last the bullion agent actually owed the company money. (Hear, hear.) That, he thought, was a full answer to the slanders made regarding the bad management of affairs, and having paid dividends improperly for Stock Exchange purposes, and he thought no answer could be stronger than that presented in those accounts. (Cheers.) He would just recall to the minds of shareholders what the mine had done. Since they started—and started virtually, he might say, without any capital at all, because the 20,000, which appeared there was swallowed up in expenses, and the directors had had to finance the company was a large deficiency due to the cost of the refinery. The whole of which was repaid—they had produced in gross bullion 1,723,000, in value. The shareholders might say a very small portion of that had come into their pockets. But how much had come into their pockets? The shareholders had received in cash about 182,000, and there were about 23,000, more earned, which the shareholders could have had in their pockets last February; and, deducting the expenditure out of revenue on capital purposes, the mine had earned 20,000, more at this day than the whole of its cost. They might say that was a small proportion of the large amount of gross produce. They had produced 1,100,400, worth of silver, 420,000, worth of gold, and 20,000, worth of copper; and the present output, although small on the gross output, had yielded the shareholders a very fair return on their capital. (Hear, hear.) It was disappointing in many ways that the returns had not been much greater; but if they compared the history of this mine with any other in existence they would find that, great as it had been our vicissitudes, they were far below the average of the vicissitudes in other mines. Take the St. John del Rey, for instance. Look at the years they went on there without dividends, and had to work for the future. In the Richmond they had always made some profit. The profit this year were tolerably fair, because they had been working for some years, and they took up 23,000, of the cost of the refinery. Mr. Probert anticipated that the mines in the neighbourhood must ultimately bring them a profitable business, and he believed they had great resources in the future. In that institution. The fact question was one which had occupied the minds of the board from the commencement. From his youth he had been familiar with the question of heat, it having been a favourite study of his, and when Mr. Probert went out he impressed upon that gentleman the importance of the question, and requested him to reduce the cost of smelting by improvement in the furnace, which would reduce the consumption of fuel. The furnace had been altered with the view of introducing coke; no doubt if they could get coke, which they hoped to do, they would be able to smelt large quantities of ore which they were now compelled to leave on the ground. The value of coke to charcoal was about 8 to 5, and if they could get coke down to the mine (which they were assured they could effect ultimately at \$35 per ton) they would effect a reduction of 30,000, or 40,000, a year in smelting cost, but until they did that they must continue to pay the cost of fuel which they were now incurring. The railway had effected a considerable saving in charcoal, which could now be obtained at 25 cents per bushel, whereas it was formerly 35 cents. Therefore the comparison was not so dead against charcoal as it was. But there were many difficulties to deal with in America. They could not sit down and calculate what

companies ought to do, but what they did do. The law had conceded certain privileges to railways which had created great dissatisfaction, because some of the companies could put on prohibitory rates to favour their own coal. He could point out a case in which the charge was five times as great as in other cases, so there was no getting coke and coal through the district to reduce the cost. Mr. Probert got a large quantity of coal down, and stacked it at Elcho, and was the butt of some considerable witicism on that account, but it really did good, and it enabled the company to defeat the combination which was formed against it. The shareholders must take those things into consideration before they judged of the action of the management; they must not accuse the directors of want of energy and foresight, because, as a matter of fact, these things had never ceased to occupy their attention. (Cheers.) He would just speak on another matter for which the board might take credit. Bit by bit the Richmond Company had bought pieces of surrounding property, so they might not be hemmed in in following the ore, and now they had, he was pleased to inform them, ten times the area with which they started, whilst their neighbour the Eureka was limited to the space they occupied at first; therefore he thought the shareholders could not accuse the directors of the Richmond of want of enterprise and foresight. He did not know that it would be wise to enter into any discussion upon the points pending between this company and the Eureka. It had taken the directors by surprise, and they were unable as yet to form any judgment upon the case. They would remember that at the time it was necessary to raise money by debenture the whole of the property was deeded over to himself and Mr. Hopkins as the trustees for the debenture holders, and therefore Mr. Hopkins and himself held the mortgage over all the assets of the company, and all the property. It might not be necessary to put that point into force at present. But he would say that the company had considered that a great protection for the future. The shareholders would very likely wish to know what the prospects of the company were whilst they were shut out of the portion of the property which was in dispute. One effect of the injunction was this—to drive them to explore in a westerly direction instead of easterly, following the main lode so taken, which would supply and keep them in full work, besides increasing the reserves. There was no great motive for continuing exploration in another direction, although it had always been bearing upon his mind, and the indications which they were told existed in their western direction were of such a promise that they should be explored at the earliest opportunity. He had sent out several times to urge it should be done, as he thought it would be taking time by the forelock. But it was only since this injunction had been obtained that the explorations had been commenced in order to explore that portion of the ground, and the effect of that exploration was that they had discovered masses of ore in spots in which there were no surface indications. This was in new ground, and was full of promise for the future. Mr. Probert started a drift from the main shaft at the 500 simply with the view of running towards the Tip top indications, with the view of cutting them at a depth which would give a large amount of stoping ground. This had been done, and therefore they had now the large space in the westerly direction which they had not when the mine started. Again, in the telegram which he read that morning they would see that the ore above No. 4 level was rich in quality and increasing. That also was a bit of promise. When the injunction was obtained the Eureka Company were driven to explore their ground, and in so doing over the No. 7 level (although their levels did not correspond with those in this mine) they struck the richest lot of ore ever found in the hill, which had kept the 500 simply with the view of running towards the Tip top indications, with the view of cutting them at a depth which would give a large amount of stoping ground. This had been done, and therefore they had now the large space in the westerly direction which they had not when the mine started. Again, in the telegram which he read that morning they would see that the ore above No. 4 level was rich in quality and increasing. That also was a bit of promise. 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the whole amount of the second mortgage bonds. Their present prospects in regard to profits were very satisfactory; since the accounts were made up the returns had been 337½ ozs. In April, of the value of 1393½, or a profit of 225½. In May the produce was 380 ozs., giving a profit of 479½; in June the produce was 385 ozs., and the profit 379½; and in July 374 ozs. were returned, and the profit was 331½. In conclusion, he (Mr. Taylor) suggested that the shareholders should form a committee to urge their fellow-shareholders to subscribe towards the debentures, and thus save the company.

Mr. H. B. TAYLOR fully concurred in all that the Chairman and Mr. Taylor had stated as to the absolute necessity of at once finding the 3000*l.* required to save the company. He then referred to the case of the Upper Assam Company, of which he had been an auditor for 14 years. In 1867 the shares fell to 6*d.* each, but by the issue of mortgage bonds the position of the company had gradually improved, and the shares were now quoted at 6½*d.* He was willing to contribute 50*l.* towards the debentures.

Lieut.-Colonel PERCIVAL said he would subscribe 100*l.*

Mr. H. B. TAYLOR remarked that the company was free until the middle of September, when bills for 7500*l.* would have to be paid.

Mr. HILL asked if the 10,000*l.* were not subscribed how would the directors get on for their money?—Mr. TAYLOR said the directors had risked their money, but the money of the shareholders who had subscribed had been placed in trust at a separate bank, and would not be touched unless the whole amount were subscribed. (Hear, hear.)

Mr. W. S. POOLE thought the directors had acted very honourably and very judiciously in this matter. (Hear, hear.)

The SECRETARY said, in reply to Mr. HILL, the total liabilities were 18,769*l.*, including the bank loan.

Mr. HILL expressed his opinion that the effect of the arrangement now being made for raising the ore would save the company a deal of expense and trouble. The report and accounts were then adopted unanimously.

On the motion of the CHAIRMAN, seconded by Mr. J. C. GOODMAN, Mr. F. E. QUIN, M.D., was re-elected a director; and on the motion of the CHAIRMAN, seconded by Mr. POOLE, Mr. R. Taylor was also re-elected a director.

On the motion of Lieut.-Colonel PERCIVAL, seconded by Mr. GOODMAN, the auditor was re-appointed.

A resolution, proposed by Mr. HILL, and seconded by Mr. POOLE, was passed appointing Lieut.-Colonel Percival, Mr. Swaffield, and Mr. Arthur, with power to add to their number, a committee to canvass the shareholders for subscriptions to complete the issue of the second mortgage bonds.

The meeting then terminated with a cordial vote of thanks to the Chairman, directors, and managers.

ENGLISH AND AUSTRALIAN COPPER COMPANY.

The half-yearly general meeting of shareholders was held at the Cannon-street Hotel, on Thursday.

Mr. R. A. ROUTH, in the chair.

Mr. C. B. ROGERS (the secretary) read the notice convening the meeting, and the report of the directors and accounts, giving estimate of profit and loss, were submitted.

The CHAIRMAN explained that this was the half-yearly meeting, and, therefore; the directors had merely to inform them what progress had been made, leaving the precise details to be supplied at the annual meeting. During the period reported on 7616 tons of ore, regulus, precipitate, and rough copper were received from various mines, as against 7662 tons in corresponding six months of the preceding year; while the quantity of ore, regulus, and precipitate smelted at Port Adelaide and Newcastle works was 5904 tons, as against 6758 tons. They made 1183 tons of copper, as against 1393 tons, and the quantity of copper shipped from and sold in Australia was 1171 tons, against 1334 tons. Passing to the net return from the company's wharf at Port Adelaide, which was 1688*l.*, against 2437*l.*, he would explain that the falling off was through the necessity of repairing the old portion of the wharf, which had been erected for 26 years, and was no longer in a proper condition to accommodate the heavy work that had to be done. The whole had now been completed, and by recent advices they learned that full business had been resumed. There was but one other point to which he need direct attention. There was a debit balance of 6620*l.*, and he thought he might congratulate them that it was no larger. He had told them in February that war would not adversely affect prices, and had this country been involved in the war it would not, but he was glad to say that we had avoided it, and although one of our best customers for copper had been temporarily taken away, he believed that keeping out of the war would be to the ultimate advantage of them all. He believed in the month of February that they were at the bottom of the market, yet there had since been a further fall of 2*l.* per ton. This was a matter beyond their control, and he was, therefore, glad their loss had been no greater, as it certainly would have been but for the great care they had taken to avoid it. At present there was very little doing in the market, and the future was a complete cloud. He might, however, tell them that in the opinion of those well versed in the copper market we have now really seen the worst, and there is a good prospect of the market rallying. He believed the next six months' operations would enable them to write off the loss of the last six months, and in the present condition of affairs, to promise more than that would not be justifiable. With reference to the low price of Burra copper in the market, the feeling that it was too low as compared with Wallaroo was general, and he noticed that it was specially referred to in the market report of the *Mining Journal* last week, it being there remarked "That Australian prices have been quoted slightly higher, but the great difference between Wallaroo and Burra, to which we have before referred, has not yet been properly adjusted, and it is a most extraordinary thing that buyers should be so dilatory in availing themselves of such a considerable advantage which Burra shows over that of Wallaroo. The price of the former is marvellously cheap in comparison with that of the latter, as a difference of 5*l.* per ton is preposterous, as it is only of comparatively recent date that the average difference has been so very excessive, and it is perfectly unaccountable. The Burra brand we believe is in every respect equal to its former expectation, and has always been celebrated for its excellence and superiority over most other brands; that it will shortly improve in value there is little doubt if the price of Wallaroo is maintained, and buyers would do well to secure it at once, for it is seldom that such an extremely favourable opportunity continues for any length of time, and it may, therefore, be subject to a very sudden and rapid advance." He did not refer to the *Mining Journal* as evidence of the fact, but it stated the general position of the case. Analyses and every other test had proved that the two coppers were perfectly equal in value if, indeed, they did not show that the Burra was slightly superior. On former occasions the equality was admitted, and the quotations were about the same—sometimes the Wallaroo and sometimes the Burra copper fetching the higher price, yet at the present time there is 5*l.* difference. Wallaroo always stands as high as any other copper in comparison with best selected, but at present the Wallaroo copper was actually fetching more than manufactured. He would only offer an opinion as to the cause, which was that contracts had been entered into to deliver Wallaroo copper in particular, and that this had caused an extra quantity to be taken off the market, thus sending up the price. In the normal condition of affairs he felt sure that the question at the present moment would be why is the price of Wallaroo so high, especially as, if there were any difference, Burra was more pure than Wallaroo. The past half-year had certainly been unfortunate, but as to the future he really thought that when they had the pleasure of meeting the shareholders again, at the end of the year, they would be in a position to place a more satisfactory statement before them. There was no motion to bring before the meeting, but he might say that he would be happy to answer any question that might be put to him.

Mr. DONALDSON considered that they ought to have profits at all times. If their manager bought the raw material at the price he should do, adverse markets ought not to have any effect upon their profits. Any slight variation in a falling market ought to be recouped in a rising one. He certainly thought that the purchases were not made in the interest of the company.

A SHAREHOLDER remarked that on the smelting operations there had been a loss, although they had purchased 150,000*l.* worth of raw material.

The CHAIRMAN said that when the market fluctuated as it had done it was almost impossible to avoid loss sometimes, and he was of opinion that during the past half year there was no one that could come more near than they had done. Every variation in the unit was telegraphed over, and the purchases were made accordingly. If they lost their sources of ore in a bad season they would lose it; they must remember in a good one which would deprive them of profits altogether. He believed their purchases for the last six months would show a profit, and he hoped that at the end of the year they would show that they had done as well as in the previous year. As to the reserve fund, it stands at 11,000*l.* here, and 4000

On the other side. They must remember, too, that out of the present adverse balance of 6620, they had actually received 3500, as dividends. The dividend paid in February was included in the balance through their having estimated their stocks of copper at more than they subsequently realized.

A SHAREHOLDER would like to know how the 4000, reserve in Australia was represented, and he had never noticed it in the accounts?—Mr. SPENCER HERAPATH said that it did not appear as reserve, but was reserved by writing off 1000, a-year to the Adelaide wharf account, which was really making it an investment in freehold land.

A SHAREHOLDER enquired whether it was not possible to buy and sell on a different principle. He thought they ought either to buy at a price allowing more margin for contingencies, or ought to sell the copper to arrive as soon as they had it ready for shipment.

Mr. FREWER said the suggestions were, no doubt, good in theory, but unfortunately the remedy was quite unattainable. If he were connected with the copper trade he would know that if they offered a parcel of copper in the London market and told him that he could probably have it delivered some four or five months afterwards he would decline to purchase, and regard the terms as opposed to the general course of business. But they to some extent meet the shareholders' views as they receive advices each month from Australia as to their make of copper, and sold a corresponding quantity out of their stock here. The difficulty referred to was not new to the directors, and they had been doing their best to remove it. He believed the directors were fully alive to the needs of the concern and the wishes of the shareholders, and he could assure them that nothing should be wanting on their part to make it what it ought to be. He reminded the meeting that the company had yielded them 6 per cent. per annum taking an average for 20 years, and that in that time they had passed through more than one period of difficulty, and would do so again.

Mr. WRIGHT said he was largely interested, he and his friends being the largest holders, and he thought that they should not take one half year's operations in order to make propositions to endeavour to injure the company. The largest and best concerns in this country, and especially those engaged in the metal trade, had not been able to make profits during the past six months, so that he could not see that it was surprising that they had not done so. It was disappointing, but he did not see that there were any grounds for complaint or alarm, especially as they were now again making profits.

The CHAIRMAN was sure that the directors would be impressed with the remarks that had been made, and being large holders themselves, would have much pleasure in announcing an improvement.

The usual complimentary vote of thanks having been given to the Chairman the meeting separated.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

SOUTH AUSTRALIAN CONSOLIDATED MINING COMPANY (Limited)—Capital 5000, in 11, shares. To acquire the leasehold lands known as the Yuda-namutana and Wheel Bliseman Mine, South Australia, together with the plant, &c. The subscribers (who take one share each) are—James Cary, Bore Lodge, Manchester, merchant; J. M. Davis, Renfrew House, Southsea, merchant; J. Garne, 15, Loftus road, Shepherd's Bush, gentleman; H. Martin, Sussex House, Highbury New Park, merchant; S. R. Pattison, Queen Victoria-street; J. M. T. Allingham, 65, Old Broad-street, solicitor; W. R. Bingley, 8, Cambridge-trace, Regent's Park, barrister.

GRAY AND DAVISON (Limited).—Capital 50,000, in 101, shares. To acquire the business carried on by Frederick Davison under the firm of Gray and Davison, of 370, Euston road, and 18, Colquhoun-street, Liverpool, organ builders. The subscribers are—Charles Eley, 59, Finchley-road, St. John's Wood, 50; C. Garbutt, Yonge-street, Holloway; C. N. Beazley, 95, Guilford-street, W.C. 80; S. D. Waddy, Q.O. Temple, 50; E. S. Balkis, 31, York-terrace, Regent's Park, 10; James Ward, 11A, Pall Mall, 10; A. Doland, Stockwell Park, 10; G. E. Giles, Nuneston, 1.

HELM AND CO. (Limited).—Capital 40,000, in 251, shares. To acquire and carry on the Grove Mills and the Vale Mills at Padiham, Lancashire. The subscribers (who take one share each) are—H. Helm, Grove House, Padiham; J. J. Helm, Padiham; E. Helm, Padiham; E. Helm, jun., Charlotte-street, Manchester; 15, Loftus road, Shepherd's Bush, gentleman; W. Waddington, Piccadilly-road, Burnley; Thomas Southworth, Alexandra-road, Southport.

PARISCENNE LAUNDRY COMPANY (Limited).—Capital 20,000, in 11, shares. To establish a laundry, &c. The subscribers are—James Hammon, 37, Edgware-road, 5; T. H. Smith Harefield, Winchmore Hill, 50; H. M. Evans, Leyton, Essex, 50; M. M'Avoy, 20, Medina-road, Holloway, 5; Alan Metcalf, 11, Redburn-street, Chelsea, 50; Robert Greening, St. Benet's Chambers, E.C. 1; F. de Thillery, Courthill-street, Bayswater, 1.

ELAS POWER COAL COMPANY (Limited).—Capital 90,000, in 51, shares. To acquire lands and minerals situate in the township of Bersham and Broughton-parish of Wrexham, Denbigh, belonging to T. L. Fitzhugh. The company will carry on business as miners, smelters, quarry proprietors, and brick and the manufacturers. The subscribers are—Henry Robertson, M.P., Pale, Merioneth, civil engineer, 4050; A. T. H. Sherreff Crogan, Merioneth, ironmaster, 200; J. W. Dean, 13, Lancaster Gate, civil engineer, 200; John Brandt, Shrewsbury, civil engineer, 200; William Low, Roseneath, Wrexham, civil engineer, 1850; T. Eytton Jones, M.D., Wrexham, 1850; N. R. Griffith, Wrexham, mining engineer, 1550. The directors are—H. Robertson, M.P., W. Low, A. T. H. Sherreff, and T. E. Jones, the qualification being the holding of 100 shares.

LAIDLAW AND COMPANY (Limited).—Capital 30,000, in 101, shares. To carry on business as livery stable keepers, &c., at Bournemouth. The subscribers (who take one share each) are—J. C. Glenacra, Bournemouth; E. J. Gandaro, Bournemouth; R. D. Sharp, Christchurch; H. Laidlaw, Christchurch-road, Bournemouth; H. Cartwright, Bournemouth; E. Offer, Bournemouth; W. Butler, Bournemouth.

RUGBY NORTH-WOLD CEMENT COMPANY (Limited).—Capital 10,000, in 101, shares. To purchase blue lias land, and to carry on the manufacture of cement, bricks, and tiles. The subscribers are—R. W. Flint, 9, St. George's-place, Canterbury, solicitor, 130; H. Sankey, Canterbury, solicitor, 1; Robert Sankey, Canterbury, 1; James Hopewell, Rugby, newspaper proprietor, 130; Ridley Tait, Rugby, printer, 25; Roland Tait, Rugby, accountant, 25; C. W. Hopewell, Rugby, accountant's clerk, 1.

THE NORTH PARADE BRIDGE COMPANY OF BATH, constituted by deed of settlement, in 1836, is now incorporated as a limited company, with a capital of 12,000, in 601, shares.

THE BATHWICK BRIDGE COMPANY, constituted by deed of settlement, in 1826, is now incorporated as a limited company, with a capital of 10,000, in 1001, shares.—(The recent accident at one of the Bath bridges, and the presumed unlimited liability of the proprietors, has no doubt led to the incorporation of the two above-mentioned companies.)

NEW ZEALAND GOLD.

Two specimens of auriferous quartz from the Moanaitari Mine, Grahamstown, Thames County, New Zealand, weighing together 1142 ozs., and valued at 1500, have been deposited at the Bank of New Zealand, Queen Victoria-street, and are now on view there.

VICTORIA.—The total yield of gold in Victoria for 1876 was 963,700 ozs., showing a decrease of 100,000 ozs. compared with 1875.

COMSTOCK MINES.—According to the returns made to the Assessor of Storey County, Nevada, the six productive mines on the Comstock lode produced the following quantities of ore during the quarter ending July 31:—

Mines.	Tons.	Average.	Bullion.
Belcher	5,837	\$23½	\$ 134,753
California	49,997	92	4,627,458
Consolidated Virginia	39,778	95	3,775,362
Chlor-Potosi	1,104	13	145,489
Justice	40,776	13	743,093
Ophir	2,650	29	78,474
Total	145,122	864	\$9,504,597

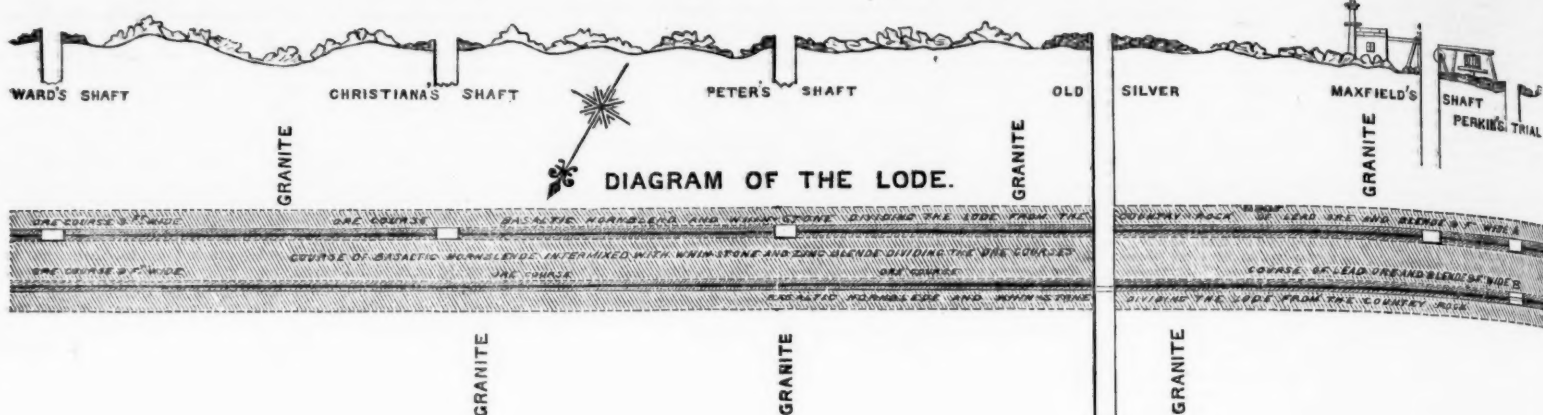
During the corresponding quarter last year the California Mine produced 31,100 tons of ore, yielding \$4,519,700, an average of nearly \$146 to the ton, and the Consolidated Virginia Mine produced 33,500 tons, yielding \$3,963,300, an average of \$118 per ton. For the same quarter the Ophir Mine produced 18,260 tons, yielding \$669,300.—*Mining and Scientific Press* (San Francisco).

LEAD MINING IN AMERICA.—(The persistent decline in the lead market has had a disastrous effect on many mines on this coast. In Utah particularly the depression has been injurious. In several camps the mines have been compelled to discharge their workmen who have had to go to work, prospecting, or anything they could find to do. The low prices in lead have prevailed a long time, and the miners seem to think the market is fried, and the price at its normal condition. This coast produces such large quantities of this most useful and widely used metal, and so many mines have been opened within the past few years, that an immensely increased production naturally resulted. Where there is so much competition the price, of course, dropped, but it was hoped that it was only temporary; now, however, that this has lasted so long, the owners of mines producing lead have been greatly discouraged.)—*Mining and Scientific Press* (San Francisco).

HOLLOWAY'S OINTMENT AND PILLS.

The finest remedies in the world for bad legs, old wounds, sores, and ulcers. If used according to directions given with them there is no wound, bad leg, or ulcerous sore, however obstinate or long standing, but will yield to their healing and curative properties. Numbers of persons who have been patients in several of the large hospitals, and under the care of eminent surgeons, without deriving the slightest benefit have been thoroughly cured by Holloway's Ointment and Pills. For granular swellings, tumours, scurvy, and diseases of the skin there is no medicine that can be used with so good an effect. In fact, in the worst forms of disease, dependent upon the condition of the blood, these medicines, if used conjointly, are irresistible.

HULTAFALL LEAD AND BLENDE MINES.



HULTAFALL LEAD AND BLENDE MINES.

SIR,—In reporting on the above mines I will not tire your patience with preliminary remarks, but go straight to the subject, knowing that the question involved in mining as well as in commerce proper is not one of fine writing but of fact. The above section and diagram have been made from measurements and notes taken on the spot, and they may be looked upon as fairly showing the position of the shafts, extent of the workings, and the width and general character of the great lode. You will see by the section that several trial pits or shafts have been sunk, but, excepting at Old Silver Mine (and there is no record of it here), nothing has yet been done to lay open the ore ground by levels. The diagram shows the Hultafall lode (measuring within the granite or country rock proper) to be 16 fms. wide, and composed of the following ingredients:—1. Resting on the granite which forms the footwall of the lode is a course of basaltic hornblende, intermixed with whinstone, 3 fms. wide; then No. 1 ore course, composed of lead ore and zinc-blende 9 ft. wide, following which there is hornblende, whinstone, and zinc-blende intermixed 7 fms. in width; then comes No. 2 ore course, composed of rich silver-lead ore and zinc-blende, about 9 ft. wide, the remaining portion of the lode (i.e., from No. 2 ore course to the granite which forms the hanging-wall of the vein proper), being filled with ingredients of similar character and width to those contained in the footwall part of the lode. The foregoing particulars show the lode to be, as previously stated, 16 fms. wide.

Taking the shafts *versum* from left to right, and reading from notes, I find that at Ward's palpable proof exists that a strong lode well charged with the ores of lead and zinc traverses the hard granite rocks up to that point for a certainty; and judging from the contour of the country, and the very marked line along the surface eastward which agree with the mean direction of the lode, I am of opinion that the Champion lode in question passes uninterrupted for miles through the country beyond Ward's shaft.

Christianas Shaft: A strong wide productive lode can also be seen here, and I can advise you to expect very profitable results if the mine be vigorously laid open and worked.

Peter's Shaft: It would only be a waste of time to go into details about the lode here; suffice it to say that it is analogous in every respect to what can be seen at Christianas.

Old Silver Mine: The shaft of this mine it is said is about 160 ft., or 25 fms. deep, and judging from the tips, or waste heaps, I should imagine that the workings have been carried down to that extent. Rich specimens of blende are scattered through the debris at surface here, but it is very probable that the principal yield of the mine was silver-lead ore, hence the expressive name of "Old Silver Mine."

Maxfield's Shaft: This shaft is now 12 fms. deep, and is 20 ft. long by 9 ft. wide, and is being sunk by a full staff of men on No. 1 ore course, which, as previously described, is composed of nearly solid blende and lead ore, the latter containing about 23 ozs. of silver to the ton of ore. The said ore course being 9 ft. wide (full width of the shaft) I estimate the yield of blende and lead ore as follows:—Blende on foot and hanging-wall of shaft together 7 ft. wide, then 6 ft. long x 6 ft. deep x 6 in. wide = 1 ton, by which rule 7 ft. x 6 ft. x 6 in. would give 14 tons for every 6 ft. in length and depth of the shaft. The lead producing part of the lode is shown in the diagram by the blue line drawn through the blende course, and may be taken at 20 in., 4 in. being allowed for stone or matrix. Taking 5 in. of the lead course to yield 1 ton of that ore the full width named would give 4 tons per 6 ft. long and 6 ft. deep of the shaft. This being so, and Maxfield's shaft being 20 ft. long by 9 ft. wide, you will readily see that the full yield for 6 ft. in depth is—blende, round numbers, 46 tons; lead ore, containing 23 ozs. of silver per ton, 13 tons. The blende should be dressed up to (say) 54 per cent., and the lead ore 70 to 73 per cent.

I would remark here that I crushed 60 lbs. weight of the ore stuff broken by myself in the bottom of the shaft, which stuff is a fair sample of the lode as I saw it. Washing this stuff by the mode which obtains in tin mines in Cornwall I got the following results:—Every pound of crude stuff yielded 4 ozs. of what I shall call crop lead ore, and 8 ozs. of crop blende, the fine ore in each case being washed away in the process of cleaning. Thus much for the size of the lode and yield of the ore course at Maxfield's shaft.

At A and B in the diagram two trial pits (locally called Perkins' trials) have been sunk each 5 to 6 feet deep, and in which a lode similar in character to that in Maxfield's shaft can be seen in the bottom and ends—in fact, cropping up even to the very surface. My opinion is that if Perkins' shaft were sunk 20 fms., or a 20 fm. level driven west to the ground in question from Maxfield's shaft, a lode and course of ore equal in size and value to the great lode in the Vieille Montagne Mines adjoining would be found. The machinery for pumping, winding, and dressing should be left to the judgment of your mining engineer, and out of courtesy to him I shall not consider the question. What you want to make this property one of the greatest mining fields of the day is to get Maxfield's shaft down to a 50 fm. level, with levels going at proper intermediate distances from that point to surface, and with communications made west to a shaft (say) 50 fathoms from Perkins' trials and east to Christianas's, you could easily get 200 tons of the mixed ores per diem. In due course a mine equal to the celebrated Vieille Montagne may be expected at Hultafall. It is said that the yield of ore from the said great mines last year was 5900 tons of lead and 54,000 tons of blende.

Radbrook, Shrewsbury, Aug. 21.

PS.—The Vieille Montagne Mines are about 400 fms. to the south of the Hultafall lode.

HULTAFALL LEAD AND BLENDE MINES, SWEDEN.

SPECIAL REPORT.

The subjoined special report upon the Hultafall Lead and Blende Mines, in the Nerick district, Orebro, Sweden, has been made for Mr. GEORGE BATTERS, of Austinfrans, by Captain RICHARD SOUTHEY, of West Chiverton:—

REPORT OF THE HULTAFALL LEAD AND BLENDE MINES, SITUATED IN THE DISTRICT OF NERICK, PROVINCE OF OREBRO, SWEDEN.

In framing my report of these mines, I will call your attention to the great extent of ground there is on the course of the lode. The

* (Being unable to show colour in our diagram, it must be understood that the pale shading represents the ore course; the closer diagonal shading the blende course; and the full black line the blue line here mentioned.) Scale: About 25 fms. to the inch.

one on which Maxfield's shaft is sunk there is in round numbers one mile in length, the bearing of the lode being north-east by south-west. Several hundreds of fathoms in a north-east direction from Maxfield's shaft there is a cross lode of great promise with about the same distance on its course as the one just alluded to, with several tons of rich blende already raised from the outcrop. The sett is held on leases for 21 years, renewable in perpetuity at the company's option, at a royalty of 2s. 2½d. for every ton taken away from the estate; these terms I consider exceedingly favourable to the investor.

MAXFIELD'S SHAFT.—This shaft is sunk on the course of the lode about 60 ft. from surface, underlying about 2½ ft. in a fathom. At the bottom of the shaft the lode varies in size, and is from 6 to 8 ft. wide, with a regular and well-defined footwall, but no true hanging wall has yet been seen. About 15 fms. west of this shaft, at what is called the Perkins Mine, the line is opened on at surface, the lead and blende bearing part being about 10 ft. wide. To the north of Perkins Mine I found another shade pit about 10 ft. deep, named the Alexandra shaft, with a limb of the lode in it producing good work for lead and blende. Between this and the former there is a horse of granite, and judging from the disordered state of the hanging wall alluded to in Maxfield's shaft as depth is attained and a cross cut put out, I have no doubt but what they will form a junction and become one lode. In Maxfield's shaft I had bored and shot ten holes, and then sampled the quantity broken, took it to London and had it assayed, with the following results:—Lead, 16.25 per cent.; zinc, 30.60 per cent; silver, 4 ozs. 15 dwts. per ton of 20 cwt. I then cut in two parts a large heap of smalls lying on the surface, which I consider the poorer portion of the mineral raised from the shaft throughout the sinking, and this sample produced as follows:—Lead, 8.50 per cent; zinc, 14.40 per cent; silver, 4 ozs. per ton of 20 cwt. These two samples will give the average value per ton of lode stuff broken in sinking the shaft from surface to the present depth. This I find to be about 8½ lbs. per ton, and assuming that the lode will produce 20 tons per fathom, which is under rather than above the mark, then the value of the lode is at least 1700. per fathom. Now from these figures I will deduct for breaking, dressing, smelting, furnace loss, and transit, 200. per fathom, so that I feel every confidence in calculating the lode in the bottom of the shaft to be worth fully 1500. per fathom.

I now come to Perkins and Alexandra trial pits at the surface, where I had six holes blasted, and having carefully taken samples from the stuff broken by these holes, I had them assayed with the following results:—Lead, 27.10 per cent; zinc, 5.40 per cent; silver, 10 ozs. 9 dwts. per ton of 20 cwt. This is exceedingly good, and worth at the very least 90. per ton as broken, without being subjected to any process for dressing. After I had thoroughly examined the lodes and sampled the different points of interest, I was allowed through the kindness of the managing director to inspect the surface operations of the Vieille Montagne Company, which sett adjoins the Hultafall estate. It is said this company send away from their works 40,000 tons of dressed blende annually, independent of lead, and, judging from the magnitude of the mines and their immense accumulation of dressed mineral at the surface, I should not say this amount is in any way exaggerated. I took due notice of the mineral under treatment, and found it to be of precisely the same character as that which is being raised in the Hultafall Mine, but, at the same time, what I saw going into the crusher was not so rich as the mineral I broke in the bottom of Maxfield's shaft. I now returned to examine the roads and facilities for treating the Hultafall ores, and, according to the experiments which I have made on a small scale since my return, I consider all that is required to dress the mineral is ordinary care and machinery adapted for the occasion—such as stone breakers, crushers, classifiers, jiggers, tables, &c. About three miles from the mine a mill with ample water for dressing purposes is at your command, and the situation for laying out the machinery and dressing-floors quite adapted for the purpose; a good road for carts and sleighs can be easily made to take the mineral to the mill at the very outside cost of 2s. per ton, so that any time as the mine progresses, if thought advisable, this could be easily converted into a railway; but for the present, until the mine is opened out, and suitable machinery erected for the reduction of the ore, I should advise carting it to the mill. I would now make a few remarks with reference to the development of the lodes and the necessary machinery suitable to treat (say) 40 tons of undressed mineral per diem.

Maxfield's shaft should at once be timbered, cased, and divided down within 8 ft. of the present bottom, and a good substantial footway put down, after which continue the sinking 5 fms. further, making a total distance from surface of (say) 15 fathoms, and then commence to drive. While this is being proceeded with clear away the earth from the back of the lode at surface, and down with a second shaft about 50 fms. distant, in the most productive part of the outcrop east or west of Maxfield's shaft as the case may be. No time should be lost in effecting a communication from one shaft to the other, as this would not only cause good ventilation, but would open up a profitable section of ore ground available for stoping in a very short time, when sinking should be resumed with all possible dispatch. A pumping and drawing engine would be required, but I would not recommend one to act for both purposes; the mine being so shallow a horse-whim would suffice for drawing purposes for the present. An engine of sufficient power to drive a crusher capable of crushing, as I before stated, 40 tons of mineral at least per diem, with the necessary appliances for dressing, should be erected forthwith at the mill already named. The road leading thereto should be put in thorough repair without delay, and in adopting this course a small staff for the present would be quite sufficient to superintend all operations until such time as returns will commence and the underground workings get into a more advanced stage.

I will now calculate the proceeds from one crusher only, and will put it down to its very lowest (say) crush 40 tons per day, which in round numbers, after allowing for all contingencies, will be about 1000 tons per month, and taking this as worth (say) only 50. per ton, is equal to 50,000. Deduct cost—pumping, raising, dressing, dues, freights, &c., 12000. leaves a net profit of 38000. on the month's working. As a matter of course the returns will gradually increase as the mine is being laid open, the output becomes greater, and the floors extended, always supposing the lode continues its present size and value. Judging from present appearances this property bids fair to become equally as remunerative as its neighbour—the Vieille Montagne Company. I beg to say, in conclusion, that I never saw

such rich deposits of mineral for such a shallow depth; and what before said I do not hesitate to repeat, if the lode holds good depth and extends in length nothing can prevent its ultimately coming one of the greatest successes that ever came under notice.

RICHARD SOUTHEY.

HULTAFALL LEAD AND BLENDE MINES.

Report to Mr. GEORGE BATTERS upon the Hultafall Lead and Blende Mines, in the parish of Hammar, and county of Orebro, Sweden, by T. CURRIE GREGORY, C.E., F.G.S.:—

On July 24 and 25 I inspected the Hultafall Mines, and now thereon. They comprise the Marettar Estate, and now are extensive, in the parish of Hammar, and county of Orebro, Sweden. The lease is for 21 years, renewable in perpetuity at the option of the company, and at a royalty of 2 kroners, or 2s. 2½d. English ton of ore. There is a railway station within 3½ miles of the mine, and from the mines to the proposed dressing-floors at Salaholm, a distance of about three miles, there is a road along which the ore can be carted for 2s. per ton. I traversed it, and also the banks of stream flowing from Salaholm, for 600 yards, to a spot whence carrying 10 tons can take the ore to the lake, about one mile, to be shipped in sailing vessels for Goteborg, though Lake Latorn, and the Ship Canal. I also sailed down the lake for a distance of 12 miles, thus satisfying myself with the thorough access of the property for shipment of ores and supplies. This property immediately adjoins the famous blende and lead mines of the Vieille Montagne Company. Their ores are taken by locomotives of wide gauge railway, 9½ miles long, to Ammerberg, where they are dressed in the most approved manner by self-acting dressing machinery. The geological formation is granite and hornblende, and extensive property has not been generally examined for lodes, and the explorations have been confined to a lode near Vieille Montagne and to my attention was directed. It is called Maxfield's, and a course north 62° east. On it, 309 ft. from the northern boundary a shaft (Maxfield's) has been sunk 61 ft. deep, 21 ft. long, and 9 ft. wide. I was enabled to examine it to the bottom, as it was clear of water. From about 5 ft. from the surface to the bottom the lode increases from 6 ft. to about 9 ft. in width, dipping average 1 ft. in 7 for the whole depth. The footwall is waving pretty distinct, and at the bottom I think I recognised the hanging wall, but it is desirable to cross-cut at once to see whether a covey at the surface, 45 ft. to the west, does not constitute a limb of the lode. I had nine holes put in the bottom of the shaft through the lode, and after the bottom was thoroughly cleaned up I then fired, and the whole of the material drawn to surface and out; this I had turned over and broken up, and inspected mine to the eye the zinc blende predominated over lead about 2 to 1. It was difficult to find a piece of blende free from spots of lead, and good solid stones of lead ore were plentiful. These come from a bar of galena running through the bottom of the shaft. The width of the lode appeared to be a mass of ore, without any gangue, but such as must necessarily be detected in assay or by mechanical manipulation. I took an average sample of the lot as nearly as could, and submitted it to Messrs. Johnson, Matthey, and Co., assay, who have declared it to contain 27.5 per cent. zinc, 13.5 per cent. lead, 5.50 ozs. of silver per ton of 20 cwt. of ore—or (say) 50. of silver to the ton of dressed lead ore, allowing it to be dressed up to 70 per cent.—and to be of 3.75 specific gravity.

In order to test the productiveness of the lode from the surface, I measured all the heaps of ore (after cutting through one), weighed a cubic foot as nearly as I could, and found that it yielded 15 tons to the cubic fathom. This was satisfactory, much as the specific gravity (3.75) gives 22 tons to the solid fathom, and seeing that the lode increases in width and in depth, and that lead is most abundant in the bottom, we may reasonably expect continued improvement as depth is attained. That the lode is persistent and productive in length is abundantly proved by shafts and pits which have been put down on it in the Latorn property immediately adjoining to the north-east.

In the Hultafall the lode is proved for a length of 473 ft. by the addition to the Maxfield shaft. In the Perkins' trial, 92 ft. to the south-east of Maxfield shaft and a few feet deep, the lode is well for lead, and 45 ft. to the west of this is the Alexandra referred to above, where there seems to be a limb of the lode, carrying blende. How far to the south-east the lode may be productive I had no means of ascertaining, but I did not observe likely disturbing causes.

I had written thus far when I was informed, to my great satisfaction, that the proprietors had agreed to add the Lerbach to Hultafall, thereby adding very greatly to the ascertained value of the company's property, and largely increasing the possible amount of output. I passed over to the Barbara shaft in the Vieille Montagne, where ore was being raised in quantity, and noted the similar appearance it bore to that from Maxfield's shaft; in fact, difference could be detected. I was informed that the shaft began at the surface 5 ft. wide, and is now at the depth of 50 ft. 20 ft. wide. This shaft is on a lode running somewhat parallel to the Maxfield lode. This, coupled with the fact that it is so productive to the south-east, promises well for the Maxfield lode in same direction.

Having ascertained the identity of the ores I visited the dressing floors at Ammerberg, and saw the whole process of dressing by acting machinery. An inspection of these floors would convince the most sceptical that this ore can be dressed. I had no doubt of my mind when I saw a sample of the ore in London, for I dressed successfully a more difficult ore in Wales years ago by the same similar machinery as that in use at the Vieille Montagne. Such machinery can be very quickly manufactured in Wales, sent out and erected in complete form for the treatment of Hultafall ores.

I have already mentioned that a site for the dressing-floors has been selected at Salaholm, a distance of little over 3 miles, and by an existing road ore can be carted thither for 2s. per ton. A diversion of this road has been partially surveyed, I am told, which a light tramway could be easily made from the mines to the floors, thereby reducing the cost of carriage. At Salaholm, a stream which flows from Dalby Sjon, or lake, and is fed by the drainage of the Vieille Montagne Mines, and 4 square miles of a water-wheel, is dammed up and serves to drive a saw-mill and a flour-mill by a water-wheel 25 ft. in diameter and 4 ft. breast. This water supply should be abundant at all times for dressing purposes. The dam could be

FOREIGN MINING AND METALLURGY.

...remain the same in the French iron trade, but the ten-
...of affairs is towards improvement. The rolling-mills are
...very well off for work; but pig-iron is, on the other hand, in little
...want, although prices are maintained tolerably firmly. The forge-
...of the Northern district have had a meeting at Valen-
...the result of this meeting was the acceptance by the
...group of an advance of 4s. per ton, already agreed to by the
...group.

The administration of the Belgian State Railways proposes to let
...prox a contract for the delivery of about 6600 tons of
...iron sleepers on the Hill system; this represents the ma-
...is required for laying about 31 miles of single line. These ma-
...are to be paid for to the extent of one-half in old iron and
...cash. The administration reserves to itself the power at the
...of letting this contract of increasing the amount tendered for
...to the extent of 50 per cent. Metallic sleepers are now expected to
...progress in Belgium; the employment of them had been
...previously decided on, and everything seems to indicate that the
...engineers have now recognised the indispensable necessity of
...them. A nuance of the specification prepared in connection with
...contract now about to be let provides that the royalty payable in
...of patent rights shall be at the charge of the State. The
...of the Forges Company is the sole proprietor of the Belgian
...of M. Hill; the other Belgian works will then have to come
...understanding with it, in order to obtain the necessary au-
...to make the sleepers proposed to be delivered. The Acvoz
...Company has just brought its rolling mill for plates into
...of Acvoz. It is proposed to again bring into operation a
...part of the Chateaufort works—probably in two months. A
...contract for 5000 tons of steel rails for the Upper Italy Railway has
...been let at Milan. The Union Company, of Dortmund, obtained
...contract at 76.6 per ton; several Belgian works tendered, but at
...higher rates. Measures are being matured for the forma-
...of a commercial syndicate at Charleroi. The Belgian iron works
...generally employ-d, but prices do not revive.

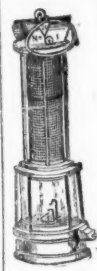
There has been comparatively little business doing in the Belgian
...trade; there is, indeed, being scarcely any interesting fact to
...and. No contracts of serious importance are expected to be con-
...until next month. It would, perhaps, be wiser now to lay
...necessary supplies, or at any rate to conclude necessary contracts,
...many consumers still appear to believe in a fall, and require
...considerable concessions in current prices—concessions which many
...owners do not wish to make, since they are hoping for a return
...of higher rates rather than otherwise. A very similar state of things
...is said to have prevailed at this period of 1876.

There has not been much doing in the French coal trade, never-
...the less some contracts have been concluded this week, although the
...situation as a whole has not changed. Purchasers show a disposi-
...to do business only when rather considerable sacrifices are made.
...their favour, while colliery owners appear to consider that they
...aimed at the extreme limit of its possible concessions. Foreigners
...seem to be benefiting most from the hesitating tone of business.
...And especially Belgian coalowners are making great, and not
...unsuccessful, efforts to secure orders. It remains to be
...whether they will be enabled to maintain the ground which
...they have gained when the situation clears up a little. A strike at
...the basin has terminated; it was of a local character, and did not
...extend to the surrounding pits, as had been at one time feared.
...The circumstances are certainly not favourable to extensive
...sales. As regards the basin of the Loire, the only point which
...has been called for notice has been a slight increase in the deliveries;
...the latter is varied, and do not appear likely to vary until the
...of September.

There has not been much doing in copper at Paris. Chilean im-
...has made 73*l*. 10*s*.; ditto ordinary descriptions, 71*l*. 10*s*.; ditto
...grade, 75*l*. English best selected, 77*l*.; and pure Croco-
...made, 78*l*. 10*s*. per ton. The German copper markets have pre-
...more animation, but prices have experienced no change.
...has not been much business passing in tin at Paris. Banca
...made 74*l*. 4*s*.; Billiton, 71*l*.; Straits, 71*l*. 12*s*.; Australian
...10*s*.; and English, 71*l*. 4*s*. per ton. The German tin market
...has been very inactive. The Paris lead market has not exhibited
...activity; French, Belgian, and German have made 20*l*. 4*s*. per
...ton, and Spanish and English, 19*l*. 18*s*. per ton. The German lead
...market has exhibited no change. There has been very little
...business passing in zinc at Paris; Silesian, delivered at Havre, has
...made 50*l*. 6*s*. per ton; and other good works, 20*l*. 4*s*. per ton. In
...zinc has exhibited rather a better tone.

THE COMSTOCK LODGE.—Some interesting particulars concerning
...the workings on the Comstock have been collected by Mr. JAMES
...of Virginia City, who states, as the result of his re-archae-
...of the shaft of the Utah is 1350 ft. deep, and 2070 ft. of drifts have
...been won on two levels. The Sierra Nevada shaft is 1700 ft. perpen-
...dicular, with no incline from it, and there are 11,000 ft. of drifts
...on the Union Consolidated and Mexican have no shafts, but work
...through the Ophir; Ophir shaft or lowest workings are at a depth
...of 1200 feet; Consolidated Virginia and California about the same
...depth; and Belcher have no shaft, but work through the Gould and
...Belcher shaft which is not considered on the Comstock, but imme-
...diately in front of or east of the Chollar-Potosi, is that of the Julia
...The next deepest vertical shaft is that of the Sierra Nevada
...all the others have inclines from their perpendiculars, com-
...ing at a depth of from 1200 to 1300 ft. None of the mines have
...more than one shaft through which they are working. The Belcher

DARLINGTON.





PARIS INTERNATIONAL EXHIBITION, 1867.



VIENNA INTERNATIONAL EXHIBITION, 1873.



LONDON INTERNATIONAL EXHIBITION, 1874.



CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

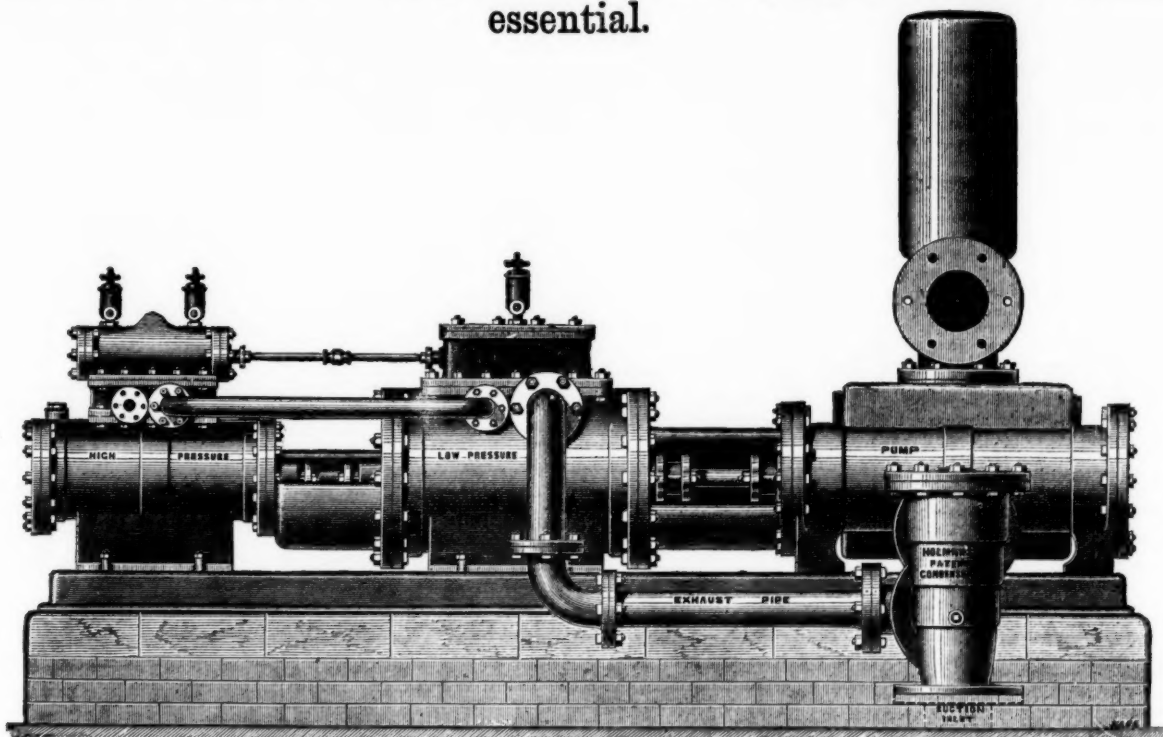
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For use in Mines, Water Works, Sewage Works, and all purposes where Economy of Fuel is essential.



After several years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once

THE SIMPLEST AND MOST CERTAIN IN ACTION.

The illustration shows an extension of the principle of this Pump to a Compound Steam Pumping Engine, by which the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere. The Engine combines simplicity, certainty of action, great compactness, fewness of parts, and consequent reduction in wear and tear.

Several thousands of the "Special" Steam Pumping Engines, with high-pressure cylinders only, are in use in British and Foreign Mines, Water Works, &c.,—and for confined situations, or where Engines of a comparatively small size only are necessary, they will still meet all requirements—but their application will be very largely increased, since it has been found practicable to embrace the important features of expanding and condensing the steam, so that increased power may be obtained, and the consumption of fuel greatly economised.

THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE is the most simple appliance for deep mine draining and general purposes of pumping ever practically developed, and the first cost is very moderate compared with the method of raising water from great depths by a series of 40 to 50 fathom lifts. No costly engine-houses or massive foundations, no repetitious plunger lifts, ponderous connecting rods, or complication of pit-work are required, while they allow a clear shaft for hauling purposes.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder.....In.	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder.....In.	4	5	6	6	6	7	8	8	8	10	7	8	10	12
Length of stroke.....In.	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate.....	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450
Diameter Suction and Delivery.....In.	3	3½	4	3½	4	5	6	4	5	6	8	5	6	8
Diameter High-pressure Steam Inlet.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½
Diameter Low-pressure Steam Exhaust.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder.....	360	330	160	360	250	184	140	360	264	202	130	360	275	175
Ditto ditto ditto—with Holman's Condenser.....	480	307	213	480	333	245	187	480	352	269	173	480	367	234
Ditto ditto ditto—with Air-pump Condenser.....	600	384	267	600	417	306	335	600	440	337	216	600	459	203

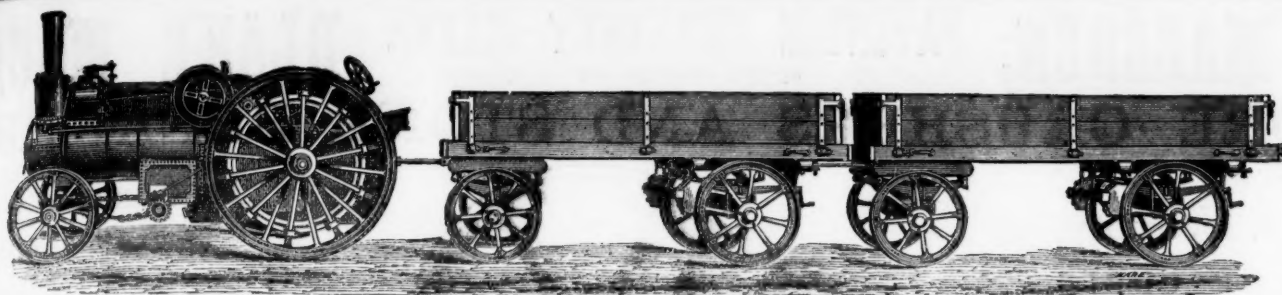
CONTINUED.

Diameter of High-pressure Cylinder.....In.	16	16	16	16	18	18	18	21	21	21	24	24	24	30
Ditto of Low-pressure Cylinder.....In.	28	28	28	28	32	32	32	36	36	36	42	42	42	52
Ditto of Water Cylinder.....In.	8	10	12	14	8	10	12	14	10	12	14	10	12	14
Length of stroke.....In.	36	36	36	36	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate.....	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,950
Diameter Suction and Delivery.....In.	6	8	9	10	6	8	9	10	8	9	10	8	10	12
Diameter High-pressure Steam Inlet.....In.	2½	2½	2½	2½	3	3	3	3½	3½	3½	4	4	4	5
Diameter Low-pressure Steam Exhaust.....In.	3	2	3	3	3½	3½	3½	3½	4	4	4	5	5	6
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder.....	360	230	160	118	456	292	202	149	397	276	202	518	360	264
Ditto ditto ditto—with Holman's Condenser.....	480	307	213	154	603	389	269	198	528	363	269	691	480	352
Ditto ditto ditto—with Air-pump Condenser.....	600	384	267	191	750	486	337	248	660	450	337	864	600	440

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Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

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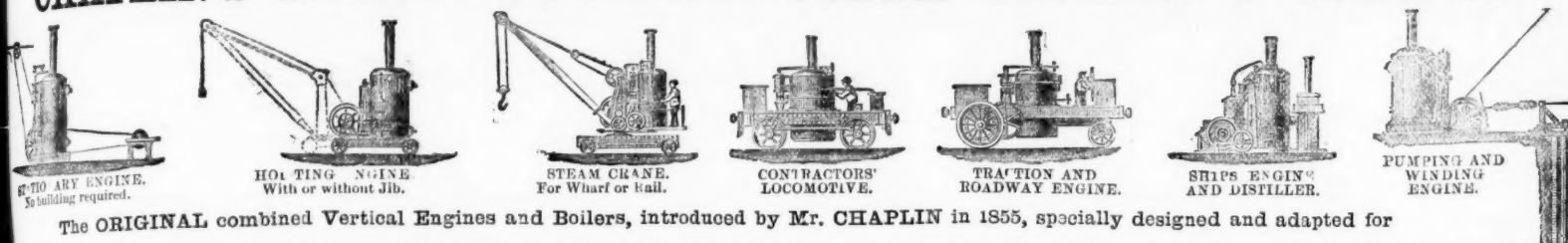
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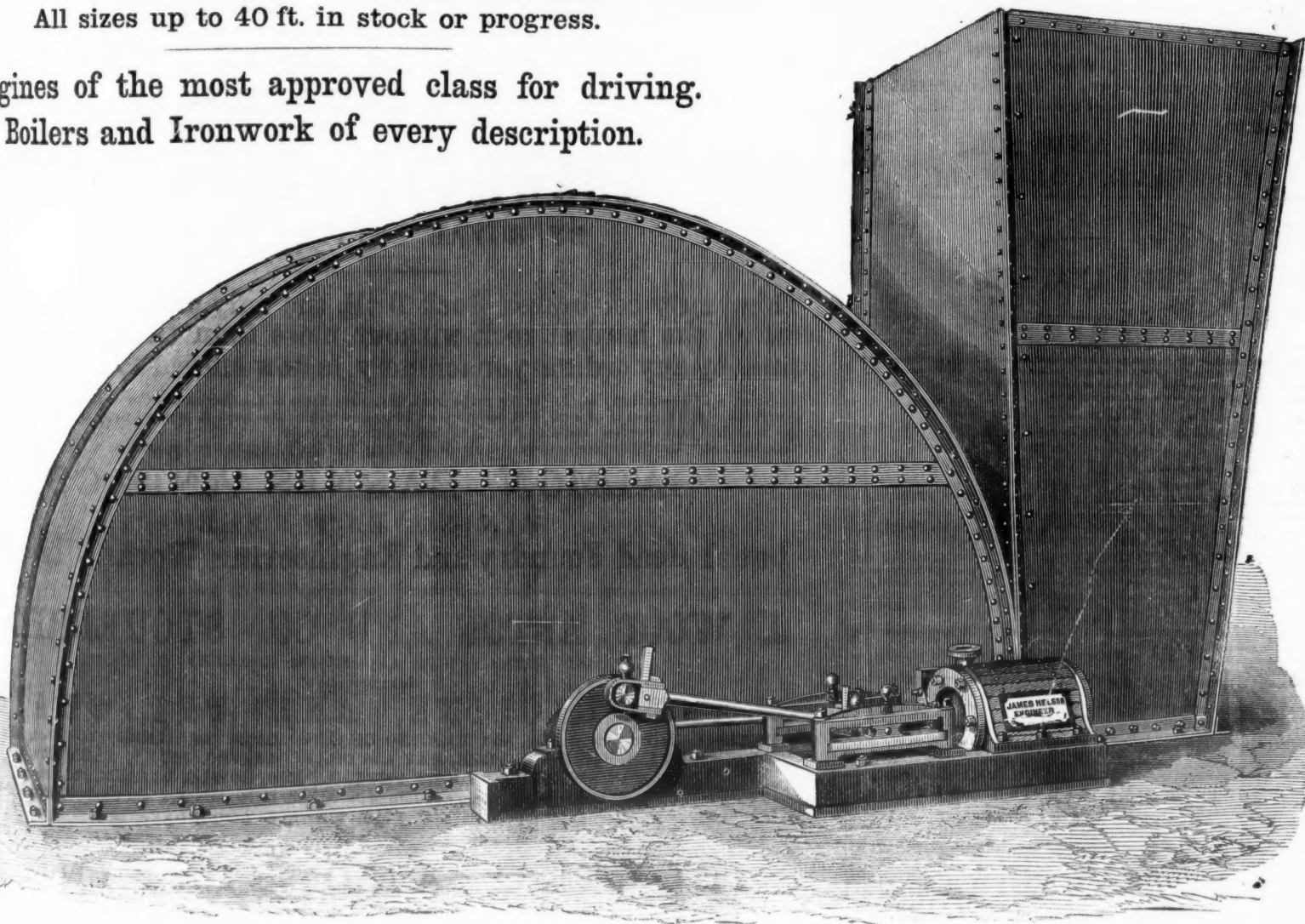
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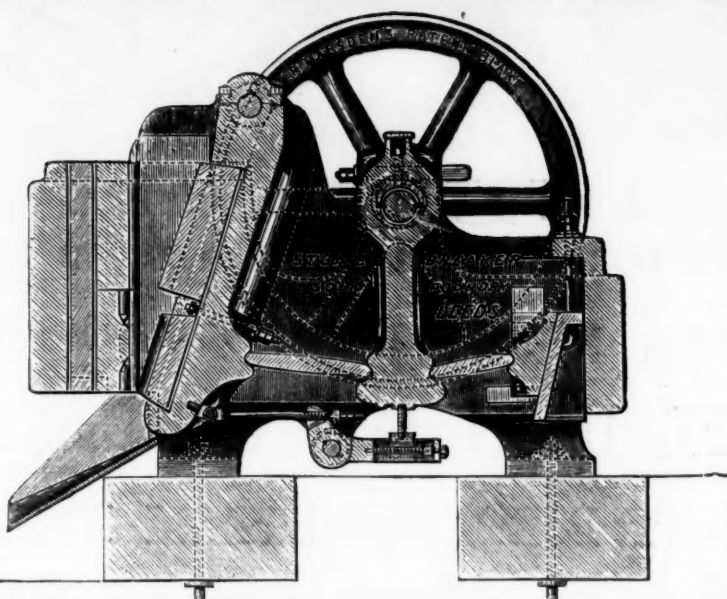
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